THE AUTOMOBILE

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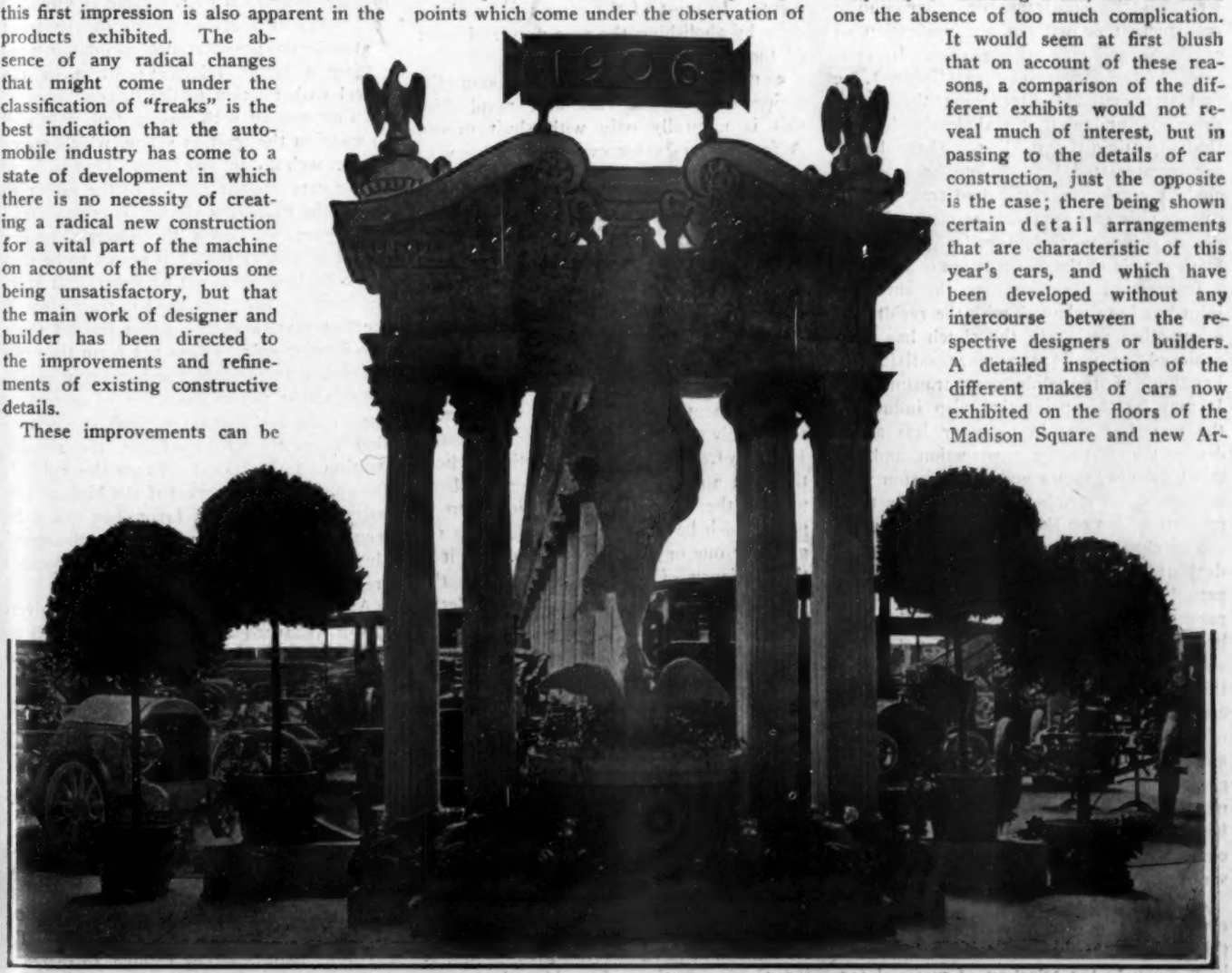
MECHANICAL SURVEY OF THE SHOWS.

THE first impression on entering the automobile shows now being conducted in New York is that of harmony, and it is a pleasing truth that this first impression is also apparent in the products exhibited. The absence of any radical changes that might come under the classification of "freaks" is the best indication that the automobile industry has come to a state of development in which there is no necessity of creating a radical new construction for a vital part of the machine on account of the previous one being unsatisfactory, but that the main work of designer and builder has been directed to the improvements and refinements of existing constructive details.

These improvements can be broadly classified under three headings: First, the outside appearance; second, the control of the car, and third, the simplification of parts. These are the three principal points which come under the observation of an intending buyer. The first inducement he has for buying a car is the pleasing outside appearance. The second one is the simplicity of handling a car, and the third one the absence of too much complication.

It would seem at first blush that on account of these reasons, a comparison of the different exhibits would not reveal much of interest, but in passing to the details of car construction, just the opposite is the case; there being shown certain detail arrangements that are characteristic of this year's cars, and which have been developed without any intercourse between the respective designers or builders. A detailed inspection of the different makes of cars now exhibited on the floors of the Madison Square and new Ar-



VISITORS' FIRST GLIMPSE OF DECORATIVE FEATURES OF THE GARDEN SHOW AFTER ENTERING THE MAIN HALL.

mory buildings reveals these facts, and more so than if they appeared in one show only. The reason for this is that these two shows are rather supplementary to each other—first, in the number of exhibits, which could not have been possible if only the limited floor space of one of the buildings had been available; and secondly, that some makes are exhibited in both shows, but represented by different chassis or forms of construction.

To speak of details, which are numerous, and as novel features, comparing the same part of the car with the general construction of cars of last year, there is one detail—the interposition of a single or double universal joint, or combination universal joint and Oldham coupling between the clutch and the transmission. The necessity for such a device was created by the unsatisfactory action of clutches, chiefly of the leather covered cone type, and also because of the rather bad strains which were found to occasion unsatisfactory action of sliding gear transmission. It has been found that the absolute alignment of clutch shaft or motor shaft and transmission shaft has not been possible without excessive wear on the sub-frame or other similar construction or without the unification of crankcase and transmission case. In some cases, as the Stevens-Duryea (Garden), we find one method of relieving the power drive of undue frictional losses by the shafts getting out of line. These losses are counteracted by complete housing, including crankcase, clutch and transmission case. This exponent of the class of such direct drive to the propeller shaft is a fine example of the construction of the type.

In most of the other cars, the universal joint has been adopted, with the result that a smoother action of the clutch has been achieved, as well as a more satisfactory handling of the slide gear transmission. It may be this point that also influences the manufacturers in more or less abandoning the sub-frame construction, and, instead, hanging motor and transmission with separate cross members, or directly by their respective lugs on the main frame.

The clutch in itself has received a great deal of attention during the development period preceding the shows. This is apparent in several forms of clutches that had been advocated before but did not make such a general appearance in the trade as this year. Although the leather covered cone clutch is still used in a great number of cars exhibited, the multiple disk clutch and expanding clutch can be found in a great number of products from progressive makers. The main object of this change has been reached—that is a metal-to-metal clutch, and a very gradual action of the same.

As far as the transmission cases are concerned, the one characteristic appearing this year is the special attention that has been given to the selection of material for the parts of the transmission as well as the adaptation of ball bearings throughout this part by a great number of makers. The selection of proper material enables the maker to produce a lighter and more reliable working transmission, which is a general characteristic of car construction this year.

Of special designs in transmission devices of the sliding-gear type, attention might be directed to the construction of the Knox (Garden) car and the Züst car (Armory), the one a home product and the other one hailing from Italy, and both striving for the same result—as before demonstrated by Mercedes cars—that is, to attain a direct drive through one bevel on the countershaft and to attain the intermediate drives through another bevel on the same shaft, thereby eliminating one gear contact otherwise necessary on the intermediate drive.

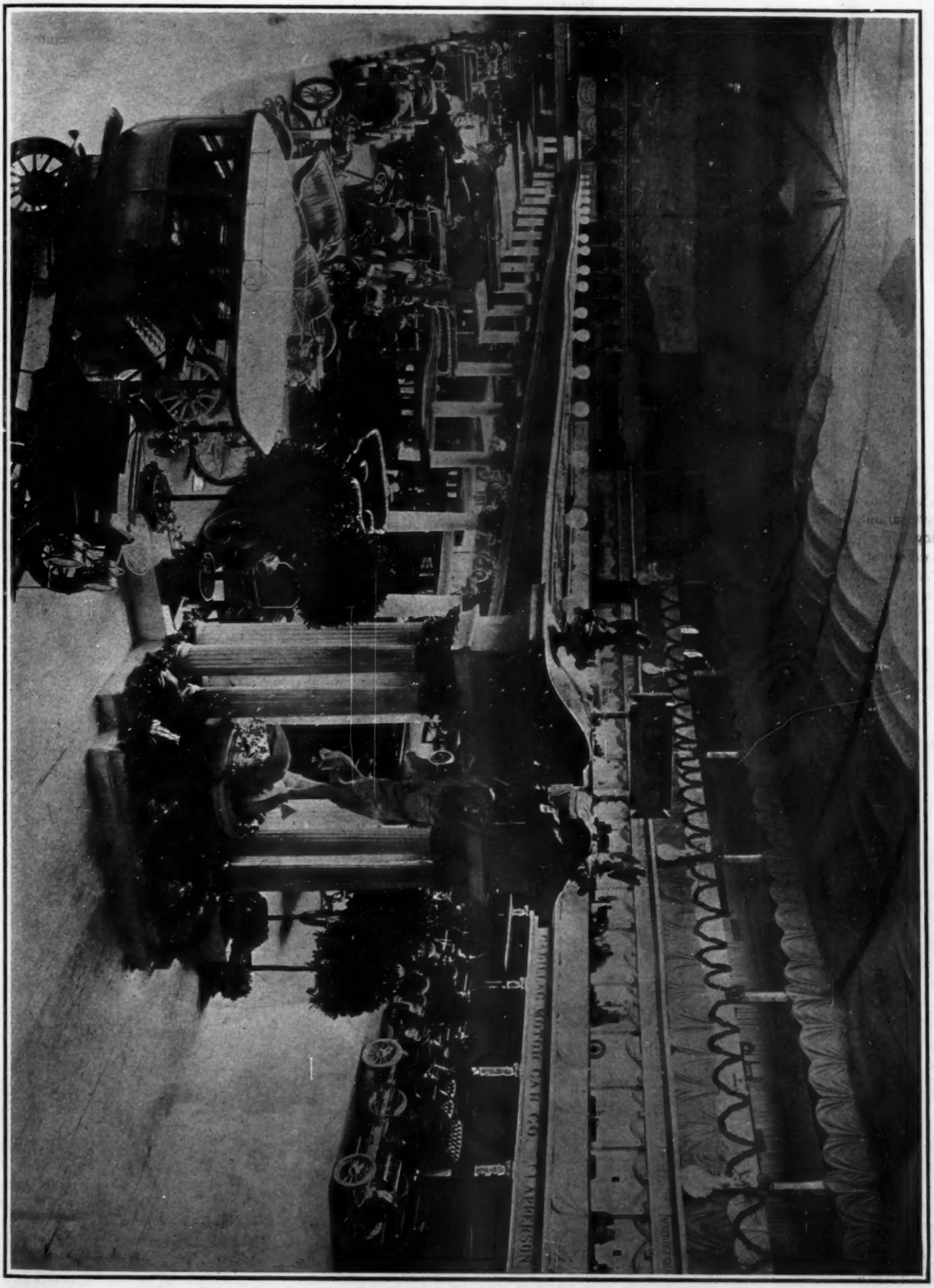
Another point of loss of energy—that is, the two universal joints on the propeller shaft—has also undergone some general changes. It is quite apparent that the tendency of the builder seems to be to reduce the losses inherent in such arrangements. In most of the cases this has been done by abolishing the rear universal joint of the transmission shaft and transferring the necessary flexibility by making the spring seat on the rear axle revolvable; this is naturally only with shaft drives. A few makers show even the tendency to eliminate both universal joints by so inclining motor, clutch and transmission shafts that the direct straight line of drive is reached from the motor to the rear axle (Northern car—Garden). Wherever a universal joint is still embodied in the construction it is usually covered by either metal or leather cases for the purpose of protecting these constantly moving links from dust, and for maintaining a permanent lubrication of same—most thoroughly detailed on C. G. V. chassis (Armory). This detail is another indication that a great deal of attention has been paid to the elimination of friction even in parts which have been neglected in this regard for one or two seasons, and that it is the efficiency of the car which needs the greatest attention throughout every detail of construction. The arrangement of universal joints in pairs between the clutch and the transmission case on chain-driven cars, where the distance between these two parts is usually greater than on shaft-driven cars, is not uniform. Some makers rely on the stiffness of the frame, and others still use one or two universal joints where there is at first sight no necessity for it, but which indicates the care with which present car construction is conducted.

Another point tending to simplicity of control is the apparent desire to make the transmission devices "fool-proof," that is for the prevention of accidental damage to parts of the gear transmission. Several prominent makers show special arrangements preventing a change of speed with a slide gear without declutching and have made this arrangement either automatic or as a locking device, forcing the operator to declutch before he attempts a change of speed and also to prevent him throwing in the clutch again before such speed has actually been made. In this connection the tendency also is to reduce the inertia of the male members of a clutch after unclutching, thereby reducing the disagreeable feature of a slide gear commonly known as "clash."

Another very important point of car control, which naturally centers in the arrangement of the control levers, is the throttle and spark control. Although some of the makers try to feel their way with the public in introducing automatic spark control, the general arrangement seems to place these levers near to or on top of the steering wheel on a stationary sector, and either ratchet or friction devices are used to maintain these levers in their given positions. The steering columns themselves do not show any radical change except that a greater inclination of the same is provided for wherever the dimensions of the front seat make this possible, such inclination producing a better relative position of the wheel with relation to the driver.

In connection with this control, it is well to mention the ignition sytem, which seems to approach a standard form. That is, most of the cars use the motion of the motor to create the necessary electric energy instead of relying solely on the electric energy stored in battery cells. It seems to be that dry cells have gone out of favor, that storage batteries are more used in their place in the last year, and that either one of these two electric sources does not form the only possibility to produce the necessary spark, but is rather put in a position of secondary importance and that either high or low tension magnetos are used for the regular ignition of the motor. From the exhibits shown, it is not apparent if the high or low tension magneto is in favor, nor can it be seen that the make-and-break or the spark plug sytem, have been given any decided preference one over the other.

A great deal of attention has been given to the construction of the axles as well as crankshafts. These two parts are mentioned together, as the material changes have been caused by the very careful selection of the proper material. On front axles the Mercedes type forging is prevalent, although some of the best makers employ a high tensile strength bronze for this all-important part of a car. Crankshafts have been treated with the utmost care. Not only the details of the design and the proper material have been selected to nearly reach a form of perfection, but also the method of manufacturing these shafts, and especially the heat treatment they receive, to increase their tensile strength—all is indicative of



ENSEMBLE VIEW LOOKING DIAGONALLY ACROSS THE MAIN HALL OF THE GARDEN SHOW FROM THE GALLERY ABOVE THE ENTRANCE.

the tremendous care, unknown before, that is given to this part of the machine. A great number of exhibitors therefore make a special exhibit of the crankshaft, showing the beautiful work that has been done in dimensioning the same as well as in the careful workmanship it has undergone. A great many cars have adopted the ball bearing support for these crankshafts, and have distributed ball bearings, mostly of the Hess-Bright type, throughout the car wherever a reduction in friction could thus be reached and a ball bearing conveniently arranged.

As to material being used throughout the cars for the most important parts, a very openly shown tendency to use the best available material for the present—that is, chrome nickel steel—is observable. This is one of the strongest indications of the care that is being given to the design and manufacture of this year's cars, as the price of chrome nickel steel is a comparatively high one, and manufacturing methods necessary for the handling of the material are very expensive, and sometimes calling for tedious treatment and special machinery. Where the home plant has been shown incapable of doing such work, the manufacturer has not shirked the high cost of importing parts in order to be able to put the best possible material into his car, in the meantime equipping his plant to handle these high-grade materials in the future himself.

A further improvement in motors which shows a tendency to reduce friction and thereby also noise, is the broad adoption of rawhide gears, especially for time gearing or other incidental gearing. As to the motor itself, there seems to be great unanimity in placing it in front of the car under the hood. Although the majority of such cars show a four-cylinder upright motor—the cylinders placed fore-and-aft—there is still a feeling of the way in two different directions, either by increasing the flexibility of the motor, or by increase of number of cylinders up to eight, or by the adaptation of the two-cycle motor, as so very convincingly shown in the Elmore and Olds cars (Garden). It is also interesting to note that the double-opposed motor receives a great deal of attention, especially for commercial vehicles, and here is one of the interesting points of the automobile industry on which a forecast as to the permanent character of the motor in this regard cannot be made, as every one of the aforementioned forms seems to be giving perfect satisfaction.

The cooling of the motor, which has been rather a standard for the last years, seems to undergo some changes of a rather interesting nature. Even in the water-cooled motor the details which govern the uniform cooling of the cylinder on its whole periphery have received great care, as shown by the dimensioning of water jackets, where cylinders are cast in pairs or where four are embodied in one casting as shown on the Northern and the new 10-horsepower Renault. The application of air vents in the crankcase or rather liberal dimensions is another indication that the designer is aware of the advantage of lowering the pressure and temperature inside the crankcase to the greatest possible extent without influencing the uniform fluidity of the lubricating medium.

The air-cooled type of motor which forces itself with giant strides to the foreground is represented by some beautiful constructions and shows the special care that the manufacturers in these lines have given to their product. That this type of motor is not any more an experiment is shown by the beautiful character of some details, proving that the manufacturer is satisfied with the principal design and has had time to give his attention to the refinements.

The oiling of motors shows a very marked tendency to unfailingly and amply provide for the necessary lubrication of all moving parts—the exhibitors being aware of the tremendous influence of this point upon wearing qualities and car efficiency. It is pleasing to see that the American designer and builder seems to be in an advanced stage in this regard in comparison with foreign cars. Most of the foreign cars use exhaust feed pressure entirely or in combination with mechanical force feed, while the American-built cars in the majority of cases are fitted with the best type of mechanical force feed oilers now in the market, or have even a special mechanical force feed oiler suitable for their respective motor design. What care the lubrication has received is shown when in some of the best cars there is practically not a moving joint for which there is not provided ample lubrication. This welcome care has gone so far that grease cups are attached even to the spring shackles.

Regarding the character of oilers, there seems to be a tendency to equip the car with an auxiliary method of oiling—that is, with a direct acting hand pump, giving for this important function the same character of a double system as we find in the ignition.

The fans employed on either water or air-cooled motors, which have been driven by all kinds of means, seem in the majority now to be driven by a flat belt, it being an indication that the manufacturer finds this to be the most satisfactory method. The fans themselves seem to increase in number of blades from year to year and the form of blades indicates that the designr is not satisfied to simply create a draft, but that he wants to know that this draft is of a satisfactory volume and direction.

Another detail which has made its general appearance is the method of attaching the forward end of the propeller shaft to the transmission, which is in most cases now cushioned between two springs. The necessity for such arrangement has come in most cases from the abolition of the rear universal joint on the propeller shaft. Another change of universal character in the cars exhibited is shown in an immense increase of dimensions of clutch and brake surfaces, comparing the same with older types. Most of the brakes are of the metal-to-metal type, with provision for ample lubrication, and follow these two points with a character of reliable stability in their working.

That the ease of control of a car is in direct connection with the flexibility regarding speed change, is shown in that not only has the flexibility of the motor been given attention, but the gear has been increased in its ratio wherever possible. To maintain compactness of design the selective type of speed changing has been adopted on a great number of cars for this year, thus giving an outward sign of the interior improved construction of the car.

Another interesting point for the prospective buyer is the fact that the ease of riding has been materially increased, as is shown by the following characteristics now general for the 1906 cars: The length of the springs wherever the, so far, standard forms of semi-elliptic springs have been maintained, has been increased to its possible limits. The leaves have been made wider, and wherever possible, regarding material, thinner. Adoption of three-quarter, full elliptic springs, platform springs, and cross springs, as well in the front of the car as in the middle of the same; the general application of different makes of shock absorbers. All are an indication that this year's car will ride a great deal easier than most of the cars of last year's make. That the reliability of controlling means has been thought—by the manufacturer—to be of great importance, is shown by a very small detail: The adoption of push pedals instead of piano brakes and clutch pedals, which is now general.

The frames are mostly of the regular pressed steel, channel section, side members, but a great deal of care has been given to the proper dimensioning of the cross members. As before mentioned, there seems to be a tendency to abolish the sub-frame, and at the same time to strengthen the stiffness of the side members by increasing their upright proportions. The appearance of wooden frames of the steel armored type is an interesting feature, but they appear in such few cases, that it seems the manufacturers in the majority are satisfied with the present construction.

Another important condition that seems to have governed the designer and builder, is the accessibility of parts, which has received special attention in motor crankcases, transmission cases and rear axles. A few thumb knobs unscrewed and one or two plates can be raised in a few seconds laying bare for inspection, and even in some cases for repair, the most vital parts of the driving mechanism.

The general adaptation of the floating rear axle for shaft-driven cars has also greatly simplified the accessibility of the parts of the same. Even the arrangement of the footboard has been changed with this view in mind, so that it can be easily folded up

THE CHAUFFEUR.
Garden Show.

or taken from the car to lay bare the essential organs arranged beneath it.

As far as car forms are concerned, more pleasing forms are shown this year from an artistic point of view than any year previous, and it indicates that the mechanical designer and car builder are getting into harmonious contact. The marked appearance of limousine, landaulet and kindred types indicates the desire of creating a body that will have its utility all the year round. This is also shown by the special manufacture of tops and by the permanent provisions of attachments on touring bodies for the fastening of same. The appearance of side doors for the front entrance in some of the cars is another indication of the eagerness of the manufacturer to provide for the comfort of the operator of a car. The details of the bodies have been gone over very carefully. It is apparent that means for the convenience of passengers have been taken care of, in providing for special pockets, footrests, separate detachable seats, and so on. The total equipment in most of the cars is as complete as can be wished, and not only gives a number of useful tools, but tools of the best workmanship.

There is apparently a tendency to increase the protection given a car and its passengers by the mud guards, as can be seen by the generous dimensioning they possess, and by the extension of their surfaces towards the car body—some manufacturers even going so far as to unite the inner edges of the mud guard with the body itself, which is naturally absolute protection for the passengers.

To summarize these observations on the general appearance and details, it must be said that the buyer is this year in a better position than he was any year before, as it is not the outside appearance of the car alone which might influence him,

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and which might not be indicative of internal value. It can be generally and broadly stated that almost every car displayed at the shows is of such high-grade workmanship and of such a thorough mechanical and harmonious designing, that the intending owner will not regret the transaction of acquiring one.

GARDEN SHOW A BEAUTIFUL SPECTACLE.

In weather that has come to be almost typical of the event, a cold rain freezing on the pavements and later in the night wrapping the city in a mantle of thin ice, the doors of Madison Square Garden opened for the sixth time to the annual automobile show on Saturday night. The first show, it will be remembered, was in November, 1900, an experiment under the auspices of the Automobile Club of America. As a side incident of this first national assemblage of American makers, there came about the organization of the National Association of Automobile Manufacturers, designed to protect and promote the interests of the trade throughout the country. The infant association soon combined with the Automobile Club of America in the organization of the second show, but as it was decided to change the date from November to January, following the French and English shows, no show was held in 1901, the second taking place in January, 1902. The third, fourth and fifth shows under the same dual management followed at yearly intervals, on much the same lines as the second. Meanwhile there had grown up, through force of circumstances, a third strong organization, the Association of Licensed Automobile Manufacturers, held together by the powerful bond of the Selden patent. Toward the end of the show of 1905 this organization came forward with a lease of the Garden for a term of five years, thus shutting out the older bodies from all participation in the profits and honors of the Garden exposition.

The automobile public is in no way concerned with the initial merits of this triangular struggle, but the immediate result, as disclosed at the opening, are of direct public interest. The practical management of the shows in former years has been faulty in many ways; there has been far too much of the noisy, blatant leaven of the old bicycle shows for which the Garden was once famous. The whole building has been greatly overcrowded, there has been no systematic arrangement of exhibits, no restraint or direction has been imposed on the sign displays, and the week has been marked by noise, confusion and disorder. It must be said for the new management that it has attempted much and succeeded well in reorganizing the whole method of the show.

The building itself has been completely transformed and two important changes effected, in the line of uniform and simple decorations. The division of the various classes of exhibits among the different parts of the building follows a regular system. The space on the main floor has been laid out with two main aisles each fifteen feet wide, giving room for the free movement of a large assemblage. Attendants in neat uniforms are stationed about the various rooms, and each of the employees of the exhibitors is provided with a metal button designating his position. Added to all this, the hall is comparatively clean, the reeds have been removed from all horns, and all advertising matter, such as the placards announcing the sales of cars, has been banished.

The scheme of decoration, carried out at a heavy expense, has met with universal commendation, both design and execution meeting the main end in view—the creation of cheerful surroundings and a proper set-

ting for the cars. The main lobby is draped on walls and ceiling with evergreen, in wreaths and garlands, and at its inner end, to usher the visitor into the amphitheatre, to left and right stand two figures in staff, maiden and youth, each in automobile attire. Face to face with the visitor as he enters is another figure of heroic size—a draped female holding aloft an automobile; at her feet a fountain with its waters illumined by lights of many colors.

Looking upward, a great change is noticed; the dusty empty spaces between the great steel arches are hidden by a ceiling of sky blue cloth, dotted with thousands of golden stars and illuminated from above by electric globes. Hangings of the same blue mask the fronts of the balconies, relieved by streamers of white. At intervals of a dozen feet around the outer face of each balcony are disposed female figures similar to the presiding goddess at the entrance, but smaller, of about life-size, each with feet resting in a great white shell. Down the center of the main floor runs a peristyle of double columns, the entablature bearing the names, in letters of gold, of the exhibitors on either side. Around the outer edge of the oval runs a similar structure, making a background for the side spaces.

One looks in vain, with a sigh of relief, for those ancient eyesores, the signs which were positively bad in themselves and those which were but little better in that they were out of harmony with their surroundings. The gallery and other of the smaller exhibits are similarly marked with plain gold letters on a background of green. The main floor is carpeted with a specially woven fabric that is warm and comfortable to the feet. It is not necessary to waste words on the physical discomforts of the cold, draughty Garden in the past; everyone who has attended the previous shows will appreciate the efforts which have been made to make the place more comfortable and more cheerful.

The new line of demarcation which has been drawn, the mystic circle of the great Selden patent, has served to relieve the crowding which was one of the serious evils of the older shows, to give more space to the spectators, and to enable the fortunate exhibitors to display their cars to much better advantage.

The main floor is devoted exclusively to gasoline cars of the pleasure class, steam having no place in this show, and commercial vehicles being relegated to the basement. Several exhibits of electric cars are found in the restaurant, with some gasoline cars to fill the space. The balcony and concert hall are given up to tires, parts and general appurtenances. The orchestra has been moved from its old place in the balcony to a special music balcony high up in the west end, where it is heard with improved effect.

While the foreign cars find a place in this American show, it can properly be called neither international nor national; the total number of exhibits being too small in proportion to both the French and American branches of the industry. At the same time it is thoroughly typical and representative; and the conclusions drawn from it would not be far wrong as applied to the whole body of American cars.

The technical reviews and the detailed descriptions of this and the following week will doubtless disclose some novelties not prominent on the opening night, but from the broad viewpoint of the general commentator there is not that noticeable change in style and form that differentiated last year's show from that of the year before; in no previous pairs of shows has there been so little difference.

The show of last year was remarkable for the unanimity of opinion among makers as to the demands of the users and the best way to meet them—in brief, with the low-priced runabout of durable construction, a larger and more powerful car but still of very moderate price, a higher grade of touring car at a price far below that of the imported car, and at the top a larger, faster and in every way finer touring car, open or enclosed, with the price limit set by the differences in the duty and cost of importation. These same cars are found this year, with many minor improvements in detail but with no radical changes of form or machinery. The covered car was so numerous in 1905 that its presence in increased numbers this year calls for no comment as a novelty.

Among the tendencies of the times, as disclosed on a surface examination, may be noted the passing of the *Roi-des-Belges* body, with its overdone curves and bulbous excrescences, and its replacement by simpler outlines and straight-line forms or by the easy, graceful sweep of the Victoria body; and the considerable displacement of the side-chain drive by the center shaft and bevel gear. A minor addition is the low side door to the space in front.

Hardly less striking than the uniformity of decoration is the uniformity in the character of the displays, to an extent never before indicated. Space by space, they run very evenly; the chassis, either stock or with special show finish, and as fully exposed as possible—the now standard car and the so-called "touring" body, properly an open surrey or double phaeton—the completely closed body, generally limousine but occasionally landaulet, or both together. The Cape or Victoria top is usually shown on the "touring" car or two cars are shown, with and without top. But few spaces have less than this display, and few have more, except when a "touring" car of the largest class is added or where the small runabout is a part of the firm's product. The general style of finish of the cars is marked by quiet colors and good taste, and on the whole there are no freaks, few striking novelties, and even few wide departures from a conventional line of type and finish.

It must not be inferred that perfection has been attained, that all the demands of users and the ambitions of makers are satisfied, and that improvement has ceased. Nothing of this kind has happened, but a certain stage of development was reached last year at which the makers had better reason than ever in the past to be satisfied with the practical tests of their product; when they could feel that they were turning out cars fully up to all reasonable requirements and to the general standard of efficiency established in older lines of machinery. With this point reached, they were in a position to devote more time to the perfection of details in the car itself, to the revision of shop methods with a view to further economy, and to similar work that was not possible during the experimental stage. There is no saying when this state of affairs may be terminated by some new discovery on the mechanical side, or some new demand on the practical side, which may upset the present quiescent conditions and start all on a new line of experimental competition; but the indications are that, for several years at least, the shows will disclose little more than wholesome deliberate progress along the lines now established.

The chief characteristics of leading American and imported foreign gasoline pleasure cars on exhibition are briefly mentioned in the following descriptions of the vehicles on view on the main floor of the Madison Square Garden:

George N. Pierce Co.—The Great Arrow cars are shown in three finished vehicles and one chassis, of the 28-32 horsepower. The smallest of the cars is on this same size of chassis, a straight-line touring body, in dark blue on body and running gear and light blue striping, with Cape top. A very stylish car is the 40-45 horsepower with Victoria body and semi-enclosed top, finished in dark Brewster green for body and running gear, with light green striping. Another chassis of the same power is fitted with a closed landaulet body with side doors for the front seat. All of the cars drive through a central shaft and bevel gear; and the Hess-Bright bearings are used on the transmission. The cars are handsomely finished, both in mechanism and bodies.

Packard Motor Car Co.—The 1906 model has a motor of 24 horsepower, four cylinders each, 4 1-2 by 5 1-2 inches, cast in pairs, the castings being made in France and shipped in the rough to the works at Detroit. Many improvements in detail have been made on the 1905 model. The drive is by central shaft with Hess-Bright bearings on the transmission. The chassis is shown with all parts specially finished and plate glass dash, a very handsome piece of mechanism. An open touring car with Cape top is shown, also a limousine body finished in

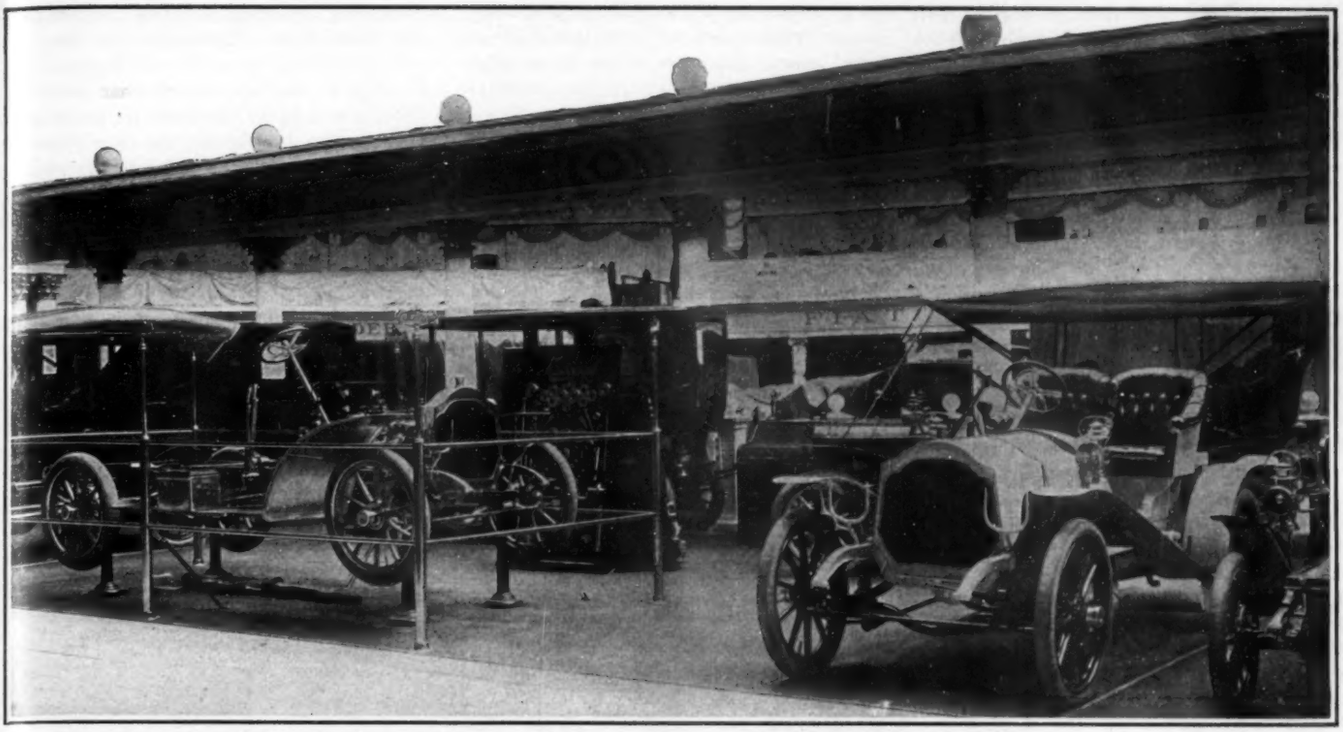
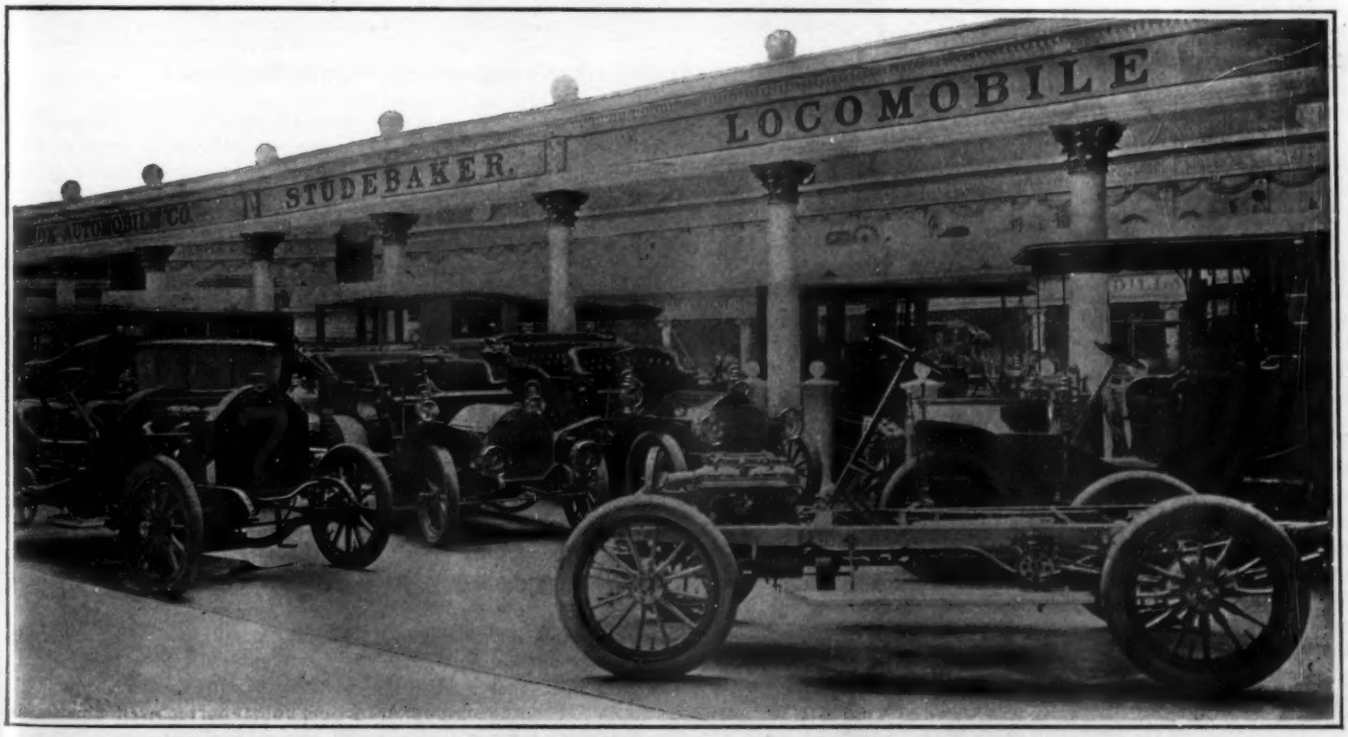


EXHIBIT OF PACKARD POLISHED CHASSIS AND COMPLETE ENCLOSED AND OPEN CARS AT THE GARDEN SHOW.

green and black, and the Packard runabout car, with seats for two in front and valet's seat in rear. An interesting feature of the exhibit is a collection of rough forgings and finished parts displayed on boards and showing the details of mechanism and the class of finish and fitting used in the cars.

Autocar Co.—The Type XII, with four-cylinder vertical motor, introduced last year, has been further perfected and is shown in three examples: the chassis, the open touring car and the limousine. The transmission is by central shaft, with direct drive on the high speed, Hyatt roller bearings being used in the gearcase. A special feature is the Autocar heavy universal joint. The touring body accommodates five people. The standard Type X runabout, 12 horsepower, is shown complete and in the chassis. The bore of the horizontal cylinders has been increased, the control has been changed to the right-hand side and other minor improvements have been made. The drive is by central shaft, with ball bearings for shafts.

Peerless Motor Car Co.—Four of the model 24-30-horsepower cars of 1906 are shown, one being the plain chassis. The drive is by central shaft, with ball bearings on transmission. One of the complete cars



LOCOMOBILE CARS AT THE GARDEN, INCLUDING THE FAMOUS GORDON-BENNETT AND VANDERBILT CUP (No. 7) CAR.

is a limousine, one an open touring car with Cape top and one a runabout, known as the Peerless "roadster," a clearly-built and smart-looking car for two persons.

Pope Motor Car Co.—The Pope-Toledo car of 1906 retains the side-chain drive on all sizes—20-24, 35-40 and 60 horsepower. The chassis of the 35-40 car is shown without a body, and also two complete cars of the same size, one with open touring body and Cape top and one with limousine body. The 20-24 is shown with touring body and Cape top and the 50-60 with touring body and Cape top, with doors to fron seat.

Winton Motor Carriage Co.—The new Model K 30-horsepower is shown in various styles, including a highly finished chassis, with all parts exposed to view. The drive is by central shaft and bevel gears, direct on high speed. Two handsome touring cars are shown, with one limousine and a runabout.

H. H. Franklin Manufacturing Co.—The Franklin cars show various changes of detail from last year, but nothing radical; Type E, 12-horsepower light roadster, is still driven by single chain, but the others by central shaft and bevel gear, with Hess-Bright bearings on transmission. One chassis is shown, the new Type G, 12-horsepower, also shown with touring body complete and Cape top. This is a family car, for four passengers, with 88-inch wheelbase and weighing 1,400 pounds. The side doors are large and open forward, as in all of this year's models. The engine on the chassis is sectioned to permit of full inspection. The 20-horsepower, Type D, is shown in two styles, with touring body and Cape top, and also with limousine body. The 1906 model, Type H, the six-cylinder touring car of 30 horsepower, is also shown. The exhibit includes a light express delivery wagon of 12 horsepower.

Olds Motor Works.—The new 1906 Model S, the Palace Touring Car, of 26-28 horsepower, is shown in two styles, with touring body and Cape top, and with racing body; also the plain chassis; there is a vertical four-cylinder engine in front, driving by central shaft and bevel gears. In this car the makers supplement the class of distinctive specialties with which the name Olds has thus far been associated and enter the general competition in the larger touring class. The body is of attractive design, with wide seats, good foot room, easy entrance through side doors and the supplementary doors in front. It is thoroughly up to date in design and mechanical detail. A new car of this year, Model L, two-cylinder, two-cycle, 20-24 horsepower, is shown, with the standard surrey body. The Olds runabout of 8 horsepower, Model B, is shown with the typical curved dash which first made the name famous, and also in a piano-box body.

Elmore Manufacturing Co.—This year the Elmore appears in the touring class with a larger and more powerful car than the famous Pathfinder of 1904-05. The new car is of the two-cycle type, with four-cylinder vertical engine of 35-40 horsepower in front, driving by central shaft and bevel gears, the chain drive being abandoned on all Elmore cars. The wheelbase is 104 inches, giving a roomy and comfortable body, and except for the two-cycle motor the car has all the features of the perfected touring type now so popular. The bare chassis is shown and also the complete car. In the smaller class is the new Model 14, three-cylinder vertical engine of 26-30 horsepower in front, with the planetary gear transmission—which is still retained on all but the big car—central shaft, and bevel gear drive.

Pope Manufacturing Co.—The Pope-Hartford car of 1906 appears in the larger touring class with a four-cylinder motor of 30 horsepower in front, and also with a smaller car, two-cylinder 18-20 horsepower; the latter shown complete with a handsome white body and Cape top, and also in the bare chassis. The Pope-Tribune is also shown in new and larger size; 15-horsepower, two-cylinder—a runabout and a surrey.

THE NEW LINE OF OLDS CARS IN THE GARDEN SHOW.

Northern Manufacturing Co.—The two-cylinder touring car introduced by this company in 1904 has grown in size and power and to it has been added a still larger car, four vertical cylinders, in a single casting, of 30-35 horsepower, with direct drive by central shaft and bevel gears. The chassis of this car is shown, also the complete vehicle with Victoria body. The wheelbase is 112 inches. The new engine is fitted with an air clutch and air brakes, a single casting forming flywheel, fan, clutch and universal and slip joints. The whole construction is simple and apparently effective; a flange on the fore end of the main shaft forms a friction disk fitting into a recess in the center of the flywheel, with a diaphragm of heavy rawhide attached to the flywheel on the fore side of the flange. The crankshaft is hollow through, with a continuous bore of about 3-8 inch through the shaft proper, webs and crankpins forming an air passage from a pump connection at the fore end of the engine to the space within the flywheel on the fore side of the diaphragm. When air under pressure is admitted through the crankshaft, the diaphragm is forced into contact with the flange on the main shaft, the inner side of flywheel recess being also faced with leather, so that the flange is gripped with varying degrees of force between two surfaces of leather. With no destructive friction and a minimum of mechanism, the clutch may be locked fast or allowed to slip to any desired extent. The details are well shown by a separate crankshaft and a sectioned flywheel. The smaller touring car, now of 20 horsepower, with the typical Northern double-opposed, self-contained engine and transmission, is shown, and also the standard 7-horsepower Northern runabout.

Waltham Manufacturing Co.—The 20-horsepower touring car new last year is shown in two styles, with the 16-horsepower runabout, all with air-cooled engines and central shaft drive through bevel gears. The new Orient buckboard is remodeled in form, with 4-horsepower air-cooled motor driving through a friction disk direct to rear axle.

Royal Motor Car Co.—The standard Royal Tourist is now of 40 horsepower, the general specifications being the same as described last year, but with improvements in various details. A highly polished chassis is shown, also a touring car, a limousine and a landaulet.

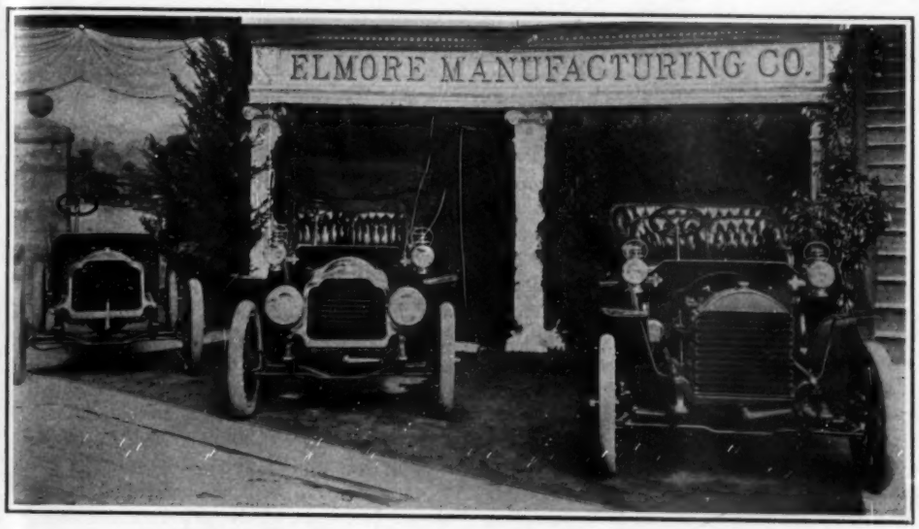
Cadillac Motor Car Co.—The four-cylinder vertical type adopted last year by this company in its 30-horsepower car has been extended by a 50-horsepower car, with cylinders 5 by 5 inches, copper-jacketed, driving direct on central shaft and bevel gears through the Cadillac planetary transmission. The wheelbase is 110 inches and the body is large and roomy. One of these cars is shown with touring body and one with limousine. The 30-horsepower chassis is shown and also the complete car with tour-

ing body. The 10-horsepower is shown with touring body, seating four and with runabout body.

Apperson Brothers Automobile Co.—The Apperson standard car of 1906 is a further development of the 24-horsepower car of 1904 from the 40-horsepower of last year to 50-horsepower, the general features being unchanged from last year. A very handsomely finished chassis is shown and two complete cars, a 50-55 limousine in light green and a 40-45 surrey in dark green. Both bodies are very stylish in outline and attractive in finish.

Walter Automobile Co.—The new 50-horsepower chassis is shown, with the complete car in a handsomely finished limousine body in carmine with black mouldings. The 40-horsepower touring car is shown in a similar coloring.

J. Stevens Arms and Tool Co.—The four-cylinder vertical motor car, new last year, is now supplemented by a still larger and more powerful car with six-cylinder motor of 50 horsepower, shown with touring body. The 20-horsepower is shown in the bare chassis, with touring body and with limousine body. The standard 7 1-2-horsepower runabout is also shown, with separate sample of crankshaft and flywheel.



ELMORE TWO-CYCLE TOURING CARS ON VIEW IN THE GARDEN.

F. B. Stearns Co.—The new Stearns is made this year in one model, a four-cylinder, 40-45 horsepower chassis of lengthened wheelbase, 118 inches, suitable for the fitting of various types of bodies. The exhibit comprises two finished cars and a highly finished chassis, together with a separately mounted change-speed of the sliding-gear selective type, and rough and finished forgings of the crankshaft and axle.

One of the cars is a "Pullman" double tonneau, with body shaped on modified King of Belgium lines, with accommodations for seven passengers, two permanent revolving bucket seats being fitted just back of the wide side-entrance doors. Occupants of these seats may ride facing either to the side or forward. Ample aisle room is left for a passageway to the rear seat. The upholstery of the car is in red leather, and with the painting and striping produces a pleasing and dignified combination of colors, which contributes to the impressive appearance of this big machine.

A prominent feature of the Stearns touring car is the exceptionally wide side door provided. Another detail is the use of a pyramid pebbled aluminum sloping footboard, which should afford a comfortable and secure foothold for the occupants of the front seats and be easy to clean and keep in good condition.

Another double side-entrance tonneau is shown, a white King of Belgium with light gray and gold striping. This car is placed in a very advantageous position just at the right of the north aisle, where, by reason of its color and the contrasting red leather upholstery, it fits in well with the decorative scheme of the Garden.

Locomobile Company of America—Three complete cars are shown, also a beautifully finished chassis of the 15-20 horsepower model, and, as an example of successful specializing, the famous Vanderbilt and Gordon Bennett Cup racer which Tracey piloted to third place in the classic event on Long Island.

The chassis of the 15-20 is not radically altered from last year's model, the changes being confined to such refinements as the fitting of bronze screwed-in valve chamber plugs with copper-asbestos gaskets, improved grouping of throttle and spark levers, and other small but important details.

A big limousine is shown on a 30-35 horsepower chassis, which is a fine example of body building. The colors selected, wine and black, with leather upholstery to match, give a note of dignity to the car, and the fitments, clock, mirror, etc., are well chosen. The seating capacity is seven, two on folding seats. The center light of the 3-light glass front between the rear compartment and the forward seat is hinged to afford easy communication with the driver.

A striking machine is the 30-35 double side-entrance touring car in brilliant vermilion with red enameled leather upholstery to match. A cape cart hood of dark gray is fitted; otherwise the car is a standard model.

The third car is a 15-20 with gray body and gear. The upholstery is in black leather, smoothly put on, without buttons or folds, and gives the machine an exceedingly trim and "shipshape" look. It is a commendable variation for a touring car from the usual lozenge-shaped tufting, as it cannot retain the dust encountered on country roads.

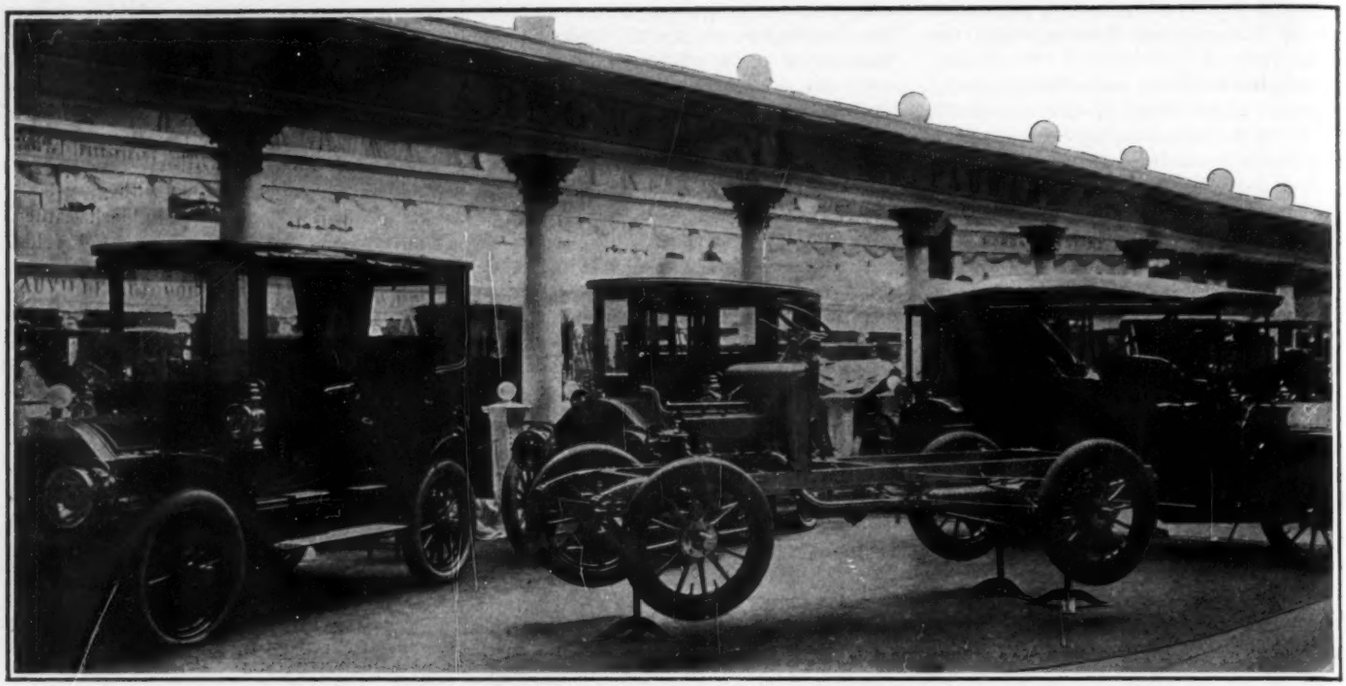
Studebaker Automobile Co.—The new model 30-35-horsepower car is shown with standard double side-entrance black body with vermilion gear and striping. A number of details in the body equipment testify to the experience of the Studebaker company in this line of work, the upholstery being particularly luxurious and having many small but carefully-thought-out comforts, among which may be mentioned a well-designed leather-covered hand grasp just back of the side doors, and a low separating arm between the front seats.

A demonstration of body building is found in the 30-35 limousine which is shown in the lead so that the excellent character of the work is at once apparent. The joining of the various members entering into a big, closed body is carefully done and from the standpoint of the critical buyer this example is a convincing argument.

The 1905 car, with a number of minor changes, will be continued as a lower power model, and the exhibit includes a finished car of this type. The color scheme is light gray with black and red striping, and bright red enameled leather upholstery, which make an effective combination.

Prominently displayed is a finely finished chassis of the new 30-35 model, which is a standardized mechanism of a high order. Four cylinders, cast in pairs, make-and-break spark from Simms-Bosch magneto, sliding-gear transmission, propeller-shaft drive, and other accepted details, are characteristic features.

Knox Automobile Co.—The feature of this exhibit is the big, new four-cylinder air-cooled car, which is a radical departure in design from previous models made by the Knox company. The familiar threaded cooling pins are almost the only features retained, the four vertical cylinders being placed tandem in front and driving through a Mercedes type change-speed and double side chains to the rear wheels. The car is rated at 40 horsepower and but one model of this type is shown. The exhibit comprises a finely finished chassis, a King of Belgium tonneau painted an agreeable soft brown, called "London Smoke," with gold and black striping and red leather upholstery, and a straight line, double side-entrance touring car in light lilac and a limousine.



PIERCE "GREAT ARROW" CHASSIS AND COMPLETE TOURING CARS IN MAIN HALL OF THE GARDEN EXHIBITION.

Both touring cars are equipped with Cape cart tops and folding plate glass fronts. This front is so designed that two sections of glass, held in heavy brass frames, are rigidly supported on vertical side supports from which extend braces to the side frame of the car midway of the hood. The upper section may be folded forward and downward, leaving an unobstructed view ahead over the lower glass.

In the matter of seating capacity, room is provided for five in the straight-back tonneau, and the King of Belgium car accommodates seven, folding seats affording accommodations for the two extra passengers.

The limousine is a sumptuous vehicle with many evidences of careful planning and conscientious work. It is done in wine and black, with fine bright red stripes judiciously applied, and gear of the same shade of red. The upholstery throughout is highest grade of morocco of the exact shade of wine to match the body. Patent leather side doors are fitted in front.

Luggage accommodation is provided by a folding trunk rack at the rear and the usual wire netting guards on the top, which in this car are designed with commendable taste. The car, taken as a whole or in detail, is one of the most admirable examples of American automobile building yet shown.

Horizontal cylinder cars are to constitute a large portion of the 1906 output of the Knox factory, and the exhibit includes two specimens of this type, one being an attractive 14-horsepower runabout in Napier green, with individual seats and Cape cart top. Planetary transmission is used, as on last year's cars, but the gearing has been changed to give 40 miles an hour on second speed. The finish of this runabout is much enhanced by a wide, flat brass binding around the dash and other parts.

The other two-cylinder car is a double side-entrance tonneau on full King of Belgium lines. The color is a light cream-yellow with striping in tan, and enameled leather to match the stripes. A Cape cart hood with folding glass front is fitted.

A change speed of the 40-horsepower car, four-throw crankshaft and other parts are shown.

Smith & Mabley Mfg. Co.—One of the most comprehensive exhibits in the Garden is the showing of the S. & M. Simplex, a car which has been patterned after the best foreign practice, with here and there a noticeable improvement in details. But one type of chassis is built, a four-cylinder 30-35-horsepower, on which bodies of practically any desired style may be built. Following the custom of the best Continental builders, the chassis is priced alone and in nearly every instance the body is made to order to suit the exact requirements of the purchaser.

A finely finished chassis is prominently located on the stand and near by are a number of chrome-nickel forgings, both finished, blanked, and in the rough. Such parts as the camshaft are shown in progressive stages, from the bar to the finished part, with the integral cams hardened and polished.

One of the least conventional types of finished cars is a Quimby hansom with black body on a vermilion chassis. The upholstery is red leather and the enclosed or rearward seat is fitted with regulation interconnected folding doors. The occupants of the hansom are protected in cold or wet weather by a folding glass front. The side glasses fall into pockets and a rear window is so hinged that it may be folded open.

A tulip tonneau by Audineau, of Paris, of graceful lines in light gray with leather upholstery to match and striping in yellow and black is a fine example of a French body as fitted to an American chassis—the reverse of the usual combination of a domestic body on a foreign chassis.

The largest car on the stand is a demi-limousine, body by Quimby, which provides seating accommodations for seven. The front seats are the usual individual bucket shape. Just back of the side-entrance doors are two permanent bucket seats, separated by an aisle which gives easy access to the wide rear seat.

The car is handsomely finished in dark red with black panels, hood and guards, and vermilion gear. Upholstery, carpets, and fitments are luxurious and match the car in color.

Haynes Automobile Co.—The entire display of this company is along lines of departure from previous practice, both models shown being new offerings for this year, though by no means untried, the higher-powered car having become familiar by reason of the favorable showing made in the Vanderbilt Eliminatory. This model is rated at 50-horsepower and has four individual cylinders, selective sliding gear change-speed and propeller-shaft drive through a roller pinion and toothed bevel of well-known Haynes design. The smaller model is a 30-35-horsepower car with cylinders cast in pairs and progressive sliding-gear change-speed and propeller-shaft drive through the same type roller pinion.

A 50-horsepower double side-entrance tulip tonneau in Brewster green, with Cape

cart hood, is the largest open car on the stand. A novelty is seen in the partially finished limousine by Quimby, which is smoothly sanded down so that the aluminum body with its brass beading is ready to be sent into the paint shop for the color and final finishing touches. Inside the body is quite completed with fawn-colored enameled leather upholstery, speaking tube, and all fitments, even to a folding mahogany table. The car is very attractive just as it is and does not seem to call for further finish.

The smaller car is shown in two models, a light, speedy-looking runabout in bright red and a maroon tulip tonneau.

Chassis of both models, beautifully polished, are placed to advantage, and parts are also shown, a particularly lucid exhibit being a mounted shaft-drive set which clearly shows the functioning of the Haynes roller pinion and toothed bevel gear.

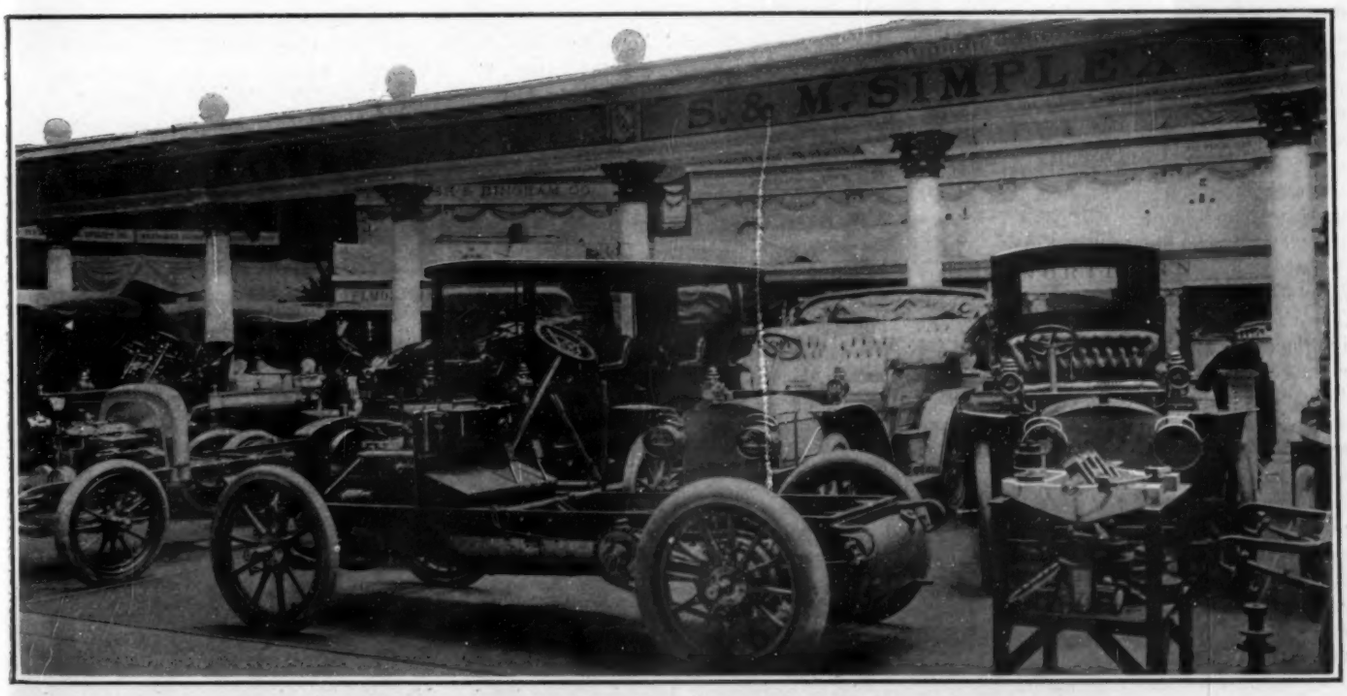
E. R. Thomas Motor Co.—At this stand the highly finished chassis of the standard model manufactured this year is shown mounted on a stand in such a manner that the flywheel may be driven by a belt from a small electric motor, thus illustrating the action of the selective gear change-speed and the characteristic Thomas ratchet and pawl sprag on the rear wheel brake drums. The gear box is covered with a glass plate through which the functioning of the gear shifting mechanism may be readily observed. Five complete cars are on view, two regular side-entrance tonneaux, a three-fourths enclosed town and country car in Brewster green, and two with luxurious and well-appointed limousine bodies. One of the open cars is finished in white paint with fine blue striping and Cape cart hood. The other differs only in finish and fittings, being painted a dark red with running gear of the same color in a brighter shade and the lining of the black Cape cart hood done in red cloth. Accommodations are provided for seven, two on removable folding seats, three on the rear seat and two in front. The limousines are on the standard chassis, one being attractively done in two shades of dark blue with blue broadcloth upholstery inside and the other a car of the same type in maroon with leather upholstered seats throughout. Both closed cars are fitted with folding removable seats for the accommodation of two extra persons.

Electric Vehicle Co.—Small changes in details and refinements here and there are to be found in the 40-45 Columbia which do not materially alter the appearance of the machine, but such things as the use of an outside governor spring, the changing of valve lift and other evidences of careful engineering add considerable value to the power plant in the way of efficiency and accessibility. As is the custom with exhibitors this year finely finished chassis are shown, a 40-45 and the new 24-28. The higher powered car is familiar except in the refinements above mentioned, but the new model possesses points of difference from the past productions of the company. Instead of double side chain drive this car is fitted with propeller shaft, driven from a sliding gear set of the selective type which gives three speeds ahead and reverse, the actuation being by means of a single lever operating through a gate quadrant. The drive on third speed is direct with no gears in the change speed driving. A finished car is shown in this model, a double side entrance tulip tonneau in dark green with black mouldings, and Cape cart hood. The absence of striping of any sort is a characteristic Columbia feature and will be noted on all the regular models.

The 40-45 open car shown is finished in a peculiar but pleasing shade of brown-red with leather to match. The body lines follow the design of the smaller car, modified tulip tonneau. Extra sliding cane seats are fitted for extra passengers. These seats when not in use slide under the forward seats and may be brought into use almost instantaneously. A small but commendable detail is the substitution of cast aluminum floor boards in front for the usual pyramid white rubber mats. Even a close inspection fails to reveal any difference, as the metal is covered with golf ball white paint giving the floor the exact appearance of rubber without any of the disadvantages of that material. To give the floor strength deep ribs are cast on the under side.

A finely finished limousine in tobacco-brown with leather to match completes the exhibit. The body is mounted on a standard 40-45 chassis and is a particularly handsome specimen of the American automobile de luxe. The inside is provided with a complete equipment of toilet requisites, sliding seats for two extra passengers, combined speaking tube and alarm, electric lights and foot warmer, annunciator with electrically lighted directions to the driver showing when a button is depressed in the rear compartment.

Buick Motor Co.—The well-known Buick car with two-cylinder horizontal opposed motor and planetary transmission as built last year is shown with a number of minor improvements and new hood and radiator. An entirely new model on the



SMITH & MABLEY SIMPLEX CARS BUILT IN NEW YORK CITY ON EXHIBITION IN THE GARDEN.

same type chassis is an aluminum finished bucket seat runabout in red leather upholstery. A chassis and a double side entrance car on this model are also on view. The novelty of the exhibit is the new four-cylinder car, a hurriedly finished example being given the place of honor on the stand. The frame, braking system, control and equipment are all along conventional lines, but the power plant is worthy of comment. The cylinders, individually cast, are 4 1-4 by 4 1-2 inches with mechanically actuated valves on opposite sides. Transmission is through a progressive sliding gear set, actuated by a side lever operating over a notched quadrant, and final drive through propeller shaft to the rear axle. This is a conventional arrangement, but the disposition of the flywheel in front of the engine and the housing of the disc clutch and its actuating mechanism and of the change speed in a continuous aluminum case gives the car a clean and unusual appearance. The entire power plant and gear set is so disposed on the frame that alignment is constant. To arrive at this end the crankcase proper is provided with two long arms, integrally cast at the front end and bolted to the pressed steel side frame members. At the back the change speed is loosely attached to a dropped cross frame member and at either side lugs are formed on the case between which and the cross member stiff helical springs are interposed. This arrangement should provide a flexible bearing for the power plant and transmission and materially assist in preserving the alignment of the crankshaft and main shaft in the change speed. The car is sold completely equipped with Cape cart hood, lamps, horn and tools and looks to be very good value.

Sidney B. Bowman Automobile Co.—The well-known Clement-Bayard cars are shown in a wide assortment of styles and powers. The most striking feature of the stand is the big 45-horsepower fast touring runabout with individual seats for two and with extra rumble at the back for mechanician. This car is painted a businesslike gray with black striping. A particularly large gasoline tank is fitted just back of the front seats and tool-hampers are built up at either side of the rear seat. From the viewpoint of the engineer the most interesting car on the stand is a finely finished chassis of the 60-horsepower model. The usual selective slide gear is fitted and ignition is by make and break from magneto. The mechanism of this car is carefully protected from dirt and injury by a stiff steel pan, which should also contribute considerably to the alignment of crankshaft and change speed. A body to fit this chassis is shown separately. It is painted a deep red with upholstery to match and has a seating capacity of seven, two on a folding cross seat with back support. This seat is contrived ingeniously so that it folds forward under the front seats, the supports fitting flush with the floor so that only close inspection reveals its presence.

A 24-horsepower chassis, beautifully finished, is located in line with the 60. This is a shaft-driven car along lines of previous models but embodying many refinements of details. High tension magneto ignition is used and the change gear set, direct driving on high, gives four speeds and reverse. A handsome brougham body is displayed to advantage, separate from the chassis. It is in dark blue with light blue and vermillion striping, upholstered inside with light gray broadcloth. It seats four passengers inside, two on self-folding seats.

A 30-horsepower, chain drive, limousine in dark blue with luxurious upholstery in whipcord completes the exhibit. Combination alarm and speaking tube, folding seats for two extra passengers and the usual toilet requisites are provided.

Smith & Mabley, Incorporated.—Mercedes, Panhard and Renault cars shown in various styles of bodies and in superb finishes make this one of the most attractive stands at the show. Fine specimens of French body building de luxe are found on a number of chassis of the three makes, one of the most striking being a St. Christopher limousine by Kelner on a Mercedes 1905 chassis. The colors are bright red and vermillion, the striping being applied with great skill and taste. The upholstery matches in color and the contrast between the red enameled leather on the seats and the dull-surfaced broadcloth with which the inside of the top is lined provides an agreeable variation from the usual method of using one material for all inside work. All of the wood trimmings are highly finished mahogany. A distinct novelty in body design is found in the use of narrow vertical panels at the rear corners of the closed body, taking from the car the usual bulging effect of sweeping curves. Full elliptic springs are fitted at the rear, the standard half elliptic in front.

Two Renaults are shown, a 10-horsepower landaulet and a 14-20 limousine. The smaller car attracts a great deal of attention by reason of the power equipment, which is the new four-cylinder engine of the Renault Bros., cast with integral heads and water jackets all in one piece. The inlet valves are automatic and the little motor presents a very compact and neat appearance. Cooling is by thermo-syphonic action with the typical Renault radiator between the driver's seat and the body. A second Renault is a 14-20 with limousine by Quinby. This car is done in deep wine with black moldings and leather to match. The seating capacity is seven, two on folding seats. Large glass windows are fitted all around and are so arranged that they may be dropped into pockets. Luggage rack is provided on the top.

Two 35-horsepower Panhard cars are prominent features of the exhibit, one a demi-limousine on King of the Belgians lines in deep red and blue body with bright red chassis and red upholstery. The other 35 is an Audineau limousine very handsomely upholstered in whipcord which is put on smooth, instead of tufted, producing a striking and pleasing effect. Two folding seats, folding mahogany table and small fitments are provided for the rear compartment. As usual the front individual seats are leather covered in smooth style of upholstering. The body color is a deep garnet with black moldings and white striping.

A chassis of the new 10-horsepower Renault is displayed to advantage and enables the visitor to make a careful study of the one-piece four-cylinder motor. A noticeable detail is the suppression of small levers on the steering wheel or column, there being nothing whatever attached to these parts. The control is effected by means of a small lever and sector on the dash which is used to regulate the motor to a predetermined speed, acceleration being accomplished by means of a small pedal conveniently located near the base of the steering column. Ignition is jump spark by Simms-Bosch high tension magneto.

American Darracq Automobile Co.—Owing to the impossibility of securing sufficient space in the Garden the exhibit of this company is necessarily somewhat incomplete, but four cars being shown in three models, the new 40-60, two 20-32s and a 15-20. Most noticeable in the outward appearance is the change of radiator, a gilled tube type being substituted for the familiar cellular. The lines of the radiator are suggestive of Mercedes design, and a new folding hood is used in place of the hinged bonnet of previous years. In the big 40-60 another innovation in Darracq practice is found in the use of a side lever for the operation of the change speed. The smallest car on the stand is the Brewster green double side-entrance tonneau on a 15-20 chassis. Next in point of power and size of body comes the two 20-32s, one a royal blue tonneau with white striping and blue upholstery and the other a duplicate except the color scheme, which in this instance is bright red. The big car is painted a deep blue with blue enameled leather upholstery and, with its wheelbase of 125 inches it is an impressive example of the latest touring car turned out by the famous French house of Darracq.

Decauville Automobile Co.—In addition to a number of Decauville cars and the C. G. V., the English Daimler is for the first time publicly exhibited in New York on this stand. The model on view is a complete touring car with deep red body and red upholstery put on in an unusual manner. It may be called a compromise between plain and tufted work, the backs of the individual front seats appearing like a conventional shell, with deep vertical panels extending from the top to the seat proper. A rather peculiar idea is noticeable in the difference in height of the back of the driver's and the other front seat, the former being some inches lower. Broadly considered, the Daimler is built on Mercedes lines, but many points are noticea-

bly different and can not be set forth in this brief mention. The braking system has been carefully figured out so that no braking effort is exerted through the gears, the emergency and service brakes working on drums on the rear and forward sprockets. To restrict the volume of the valve chamber space the valves are set into the cylinders at an angle from the vertical. Another distinctive feature is the gilled radiator head which in these days of uniformity of design will be an easy means of identifying the car on the road. The rated horespower is 30-40.

The Charron, Girardot & Voigt car is a handsome landaulet-limousine by Muhlbacher & Fils built on a 20-25-horespower chassis. The color is deep blue with fine gold striping and the upholstery a combination of morocco and broadcloth. The body is unusually roomy with a deep luxurious seat for two. The carrying capacity is increased by two folding seats. The interior is lighted with electric lamps and the small fitments are carefully selected.

Two Decauville cars are shown, one an inside driven hansom for two with folding front glass and removable side windows. The body is by Audineau and is painted a deep blue with light blue stripes, leather to match. Ample room is provided for entrance to the car from either side. The chassis employed is a 12-16 with four-cylinder motor and shaft drive. The 24-28-horsepower landaulet is attractively finished in dark green with snuff-colored morocco upholstery. Accommodations for four passengers are provided inside, two on a hinged seat of novel design. The body is attractively striped with vertical stripes of different width, repeated at regular intervals. The motor is equipped with double ignition, high tension magneto and battery.

Hollander & Tangeman.—The most striking feature of this stand is the highly polished exhibition chassis of the 35-horsepower Fiat car, 1906 model. A number of small changes are noticeable from the practice of last year, such as inclosed governor, brake rods instead of flexible cables, a new radius rod and casing for gear shifting mechanism. A sumptuous car is seen in the 24-32 *Berline de voyage*, the large closed body being painted in dark red with bright red chassis and striping of black and gold. The front seats are upholstered in red leather and the inside of the closed compartment in a warm fawn-colored broadcloth. Seating accommodations for five, two on removable seats. The usual polished brass metal work is in this car replaced by heavy silver plate.

A 16-20 limousine by A. T. Demarest & Co. is in black paint with yellow striping and gear. The upholstery inside is whipcord with seats for five, two on folding forward facing seats, two on the rear seat and one on a drop seat. Outside or driver's seats are smoothly upholstered in black enameled leather. Mud guards are of black patent leather.

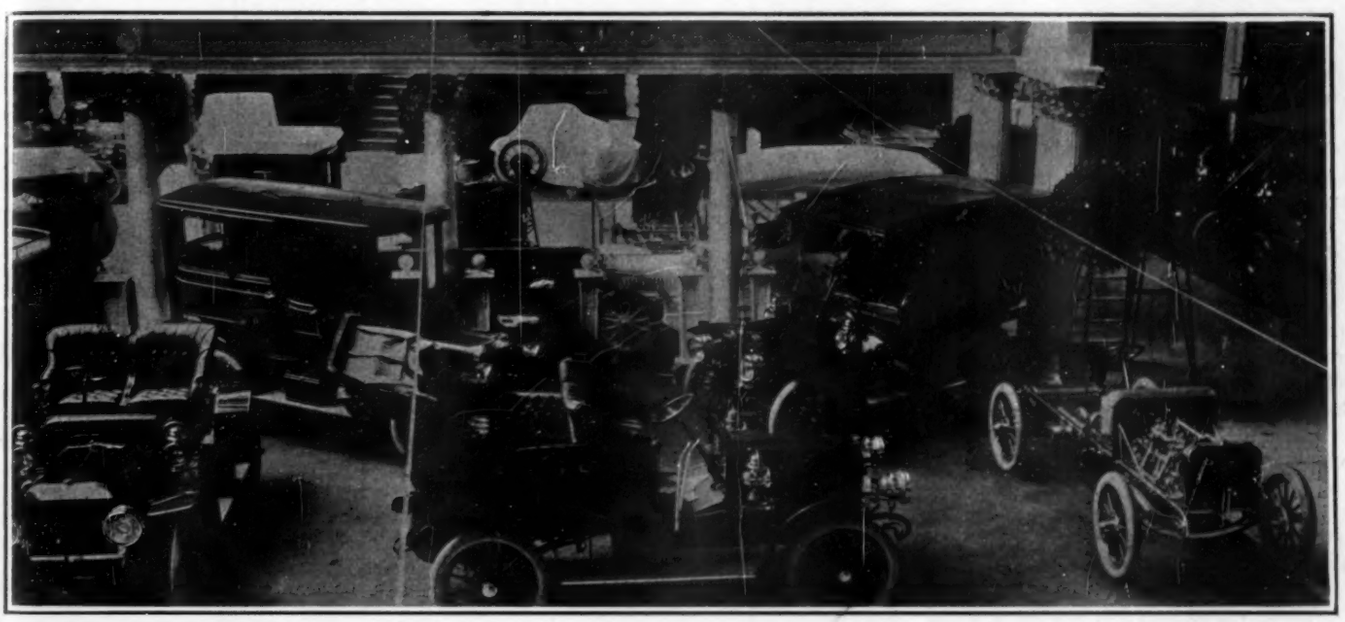
The triple phaeton with body by Rothschild & Fils, on a 60-horsepower chassis, is one of the biggest and finest appearing cars ever imported by the Fiat company. It is painted a deep rich red with luxurious upholstery to match. The seating arrangement provides accommodations for seven, two in individual seats in front, two in individual seats just back of the very low side-entrance doors, and three in the rear. The intermediate seats are divided by an aisle giving ready access to the back seat. The car is a fine specimen of chassis and body building and attracts a lot of attention.

Auto Import Co.—This company imports the well-known Rochet et Schneider, made in Lyon, France. A number of cars and one exhibition chassis are displayed on the stand. The chassis is a 30-35, highly polished and one of the best specimens of French workmanship in the Garden. A number of refinements are noticeable, but in the main mechanical features the car is not materially changed from last year's successful model. A flywheel fan has been added, also a new metal clutch which is lubricated from the two rear cylinders by means of an oil passage through the crankshaft.

Two chassis of this type are shown with bodies fitted, one a speedy looking victoria tonneau with top, body by Faurax & Cie, Lyon, and the other a side-entrance touring car by Audineau with tulip type body. The Lyon built body is painted a deep blue with bright and vermillion striping and red gear. It should prove a fast and luxurious town and country car. The other 30-35 is deep green with dark red gear and upholstery. A Cape cart hood of enameled leather is fitted and the broadcloth lining is of the same shade of red as the gear. Dust covers to all seats, leather covered hampers and lamps complete the equipment.

Another Faurax body is shown on an 18-22-horsepower Rochet-Schneider chassis, a deep olive green landaulet with bright yellow gear. Olive colored upholstery is found throughout, in broadcloth inside and in leather for the front seat. The carrying capacity of this car is five, two on folding cane-seated chairs inside.

The big car of the exhibit is a 40-50 limousine by Lamplugh & Cie, in maroon with black stripes. The front seats are covered with black enameled leather and the inside of the closed compartment with fawn-colored whipcord. Five passengers



EXTENSIVE ARRAY OF WINTON 1906 CLOSED AND OPEN TOURING CARS AND CHASSIS IN THE GARDEN SHOW.

are carried inside, two on revolving removable seats. The finish of the inside of the top is beaded mahogany, highly polished. The windows, which are framed in mahogany, are of large size, so arranged that they may be dropped into suitable pockets, providing an exceptionally open body for this type of car. The body is very deep and luxurious and altogether a very fine specimen of recent Parisian work.

Electrics in the Garden "Restaurant."

SPACE in the Madison Square Garden restaurant is devoted mainly to the exhibition of electric pleasure vehicles. These follow closely the lines of horse-drawn town vehicles and such minor changes as are made from season to season are more in body lines and finish than in mechanical construction. Improvement lies along the path of increased battery efficiency resulting in greater radius of action, and in comfort and convenience of the passengers. The demand for electrics has a constant and large growth amounting to as much with some factories as 60 and 70 per cent. per year.

Pope Motor Car Co.—One of the largest lines of models displayed in the entire Garden show is the array of Pope-Waverley electric vehicles. This includes a stanhope with victoria top, a stanhope "Special," a chelsea with removable coupé top, a surrey with extension leather top, a physician's road wagon with canopy top, leather side curtains and glass wind shield, and a chassis adapted to take either an open stanhope body or a closed coupé body for winter use. The full Waverley line comprises fifteen styles of electric carriages and industrial vehicles, with eight different chassis or running gears. Owing to the wrecking of one of the cars bringing the exhibit from the Indianapolis factory to the New York Show, the runabout and several other models were injured so that they could not be displayed on the opening night. But a new shipment was immediately ordered by telegraph. Of particular interest in the exhibit is the chassis without body. This has a pressed steel channel section frame with spring suspension like a gasoline car. At the front is a bonnet with rounded front under which is carried one third of the 30-cell battery, the other two-thirds of which is carried on a special rack on the frame over the rear axle. Steering is by hand wheel, and speed control by a half wheel mounted on the steering column under the steering wheel. The controller is carried on the chassis under the footboard. There is a concave pressed aluminum dash, having a box for the storm boot. The single electric motor is suspended from the frame at its front end and attached to the tubular rear axle on its rear side, thus getting some of the benefit of the springs. Drive is by direct herringbone silent gears to the differential, whence floating live axles transmit it to the wheels. A stanhope, victoria or coupé body can be fitted in a short time, providing a serviceable town vehicle for all seasons. Another feature of the Waverley exhibit is a General Electric mercury vapor transformer for charging storage batteries from alternating current.

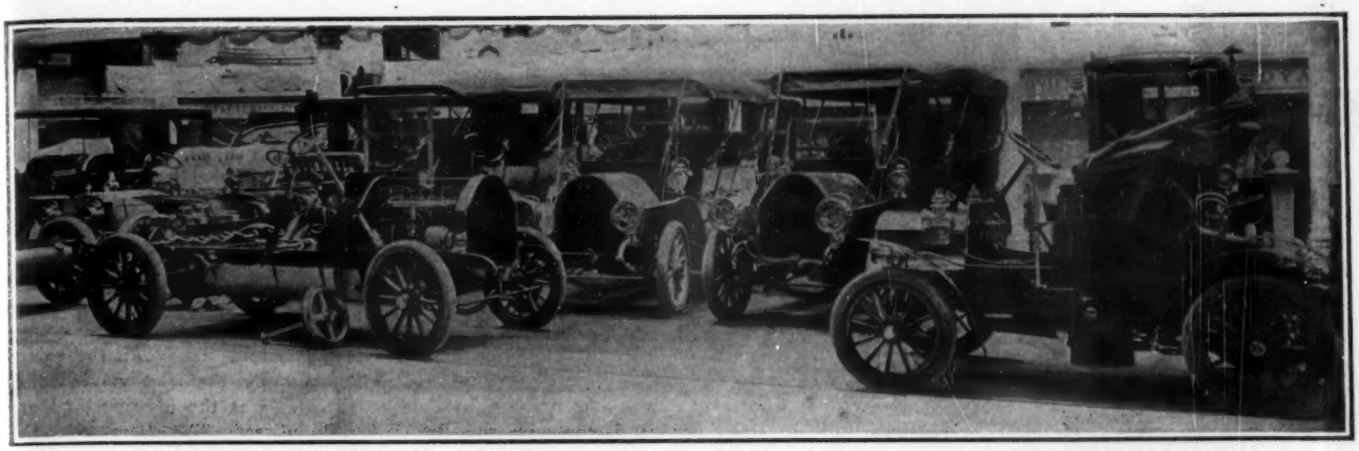
Electric Vehicle Co.—An entirely distinct exhibit from the same concern's showing of gasoline vehicles on the main floor. It includes five separate electric cars—brougham, hansom, landaulet, victoria-phaeton, and victoria. All are mounted on the same chassis, running on 32-inch wheels shod with Michelin tires. Five separate forward speeds—the maximum eighteen miles an hour—and three reverse. Two powerful independently-operated brakes and a safety cut-out switch insure certainty of control under all driving conditions. The 44-cell 13 M V Exide battery is in each vehicle, carried in a single tray beneath the body. This battery insures a positive traveling radius of forty miles on one charge. The variety of body design and the luxurious upholstering combine to make the exhibit one of the handsomest in the restaurant, if not in the entire show. The victoria, in maroon and black, with maroon upholsterings, looks to be a remarkably easy-riding car, the body being mounted on C springs which render shock absorbers unnecessary. This car is, besides, one of the lightest—though largest—in the exhibit, weighing but 3,700 pounds. The interior fittings of the hansom is the *pièce de resistance* of the show in the line of artistic upholstering. Seats and sides are cushioned with lavender broadcloth, all the trimmings matching. All these vehicles are for private service only, and seem to appeal especially to the ultra-discriminating class of users.

Columbus Buggy Co.—One French victoria seating two passengers and a four-passenger surrey, both electric, are shown by this company. Both styles have pressed steel frame, full elliptic rear springs and half platform front springs. Axles are tubular and non-revolving, drive being by spur gear to a countershaft and by double side chains to the rear wheels. A 24-volt motor is carried in the body under the seat and the twenty-four cell Willard battery is divided, some cells being carried under a hood in front and the rest in the rear of the body. Steering is by side lever on the left side and internal expanding brakes on the rear wheel hubs are operated by pedal having a ratchet. The victoria has a supplemental emergency brake on the motor shaft which is operated by the controller handle. The victoria has four speeds ranging up to twenty miles an hour and the makers claim a mileage of seventy-five miles on third speed and fifty miles on top speed on one charge of the battery. The surrey has a maximum speed of sixteen miles, and a mileage of sixty miles on one charge. In addition to the two styles shown the company makes a two-passenger brougham and an extension front brougham for four passengers, with glass wind shield in front. In all models the chassis is independent of the body, and all the electrical equipment, including motor and controller, and the differential gear and hand brake are grouped into one unit which can be dropped away from the chassis in a few minutes by simply loosening four volts.

Studebaker Automobile Co.—Five styles of electric vehicles constitute the Studebaker display of pleasure cars. These are a doctor's brougham in rough finish, a high speed stanhope, a regular stanhope, a phaeton and a runabout, all finished in black except the brougham. The brougham is especially adapted for winter use in town, being entirely closed, with large front glass and the steering and control being effected from inside. There is seating capacity for two. This is the newest model of Studebaker electrics. Another model was to be added to the display Monday, when an electric ambulance was expected to arrive. All the Studebaker electric pleasure vehicles have divided batteries, some of the weight being carried over either axle. A single motor drives by double side chains and the speed range is up to eighteen miles an hour. A double set of brakes act on the rear wheel drums.

Vehicle Equipment Co.—While big electric commercial vehicles constitute the major part of the output of this company, which has an imposing display of them in the basement, three styles of electric town pleasure cars are on exhibition in the restaurant. These are a brougham, a victoria and a landaulet. These are finished in rich colors and are luxuriously upholstered. Their notable characteristics are high box seats and short wheelbase, facilitating turning in congested thoroughfares in the shopping district. Each has an equipment of two motors of 1 3-4-horsepower each driving by spur pinion to spur gears attached to the rear road wheels.

Babcock Electric Co.—This Buffalo company, which has been building electric vehicles for six years, shows four models, three styles of stanhope and the Babcock Special. The Babcock Special represents a radical departure from its other types. It is intended for business purposes, and besides having a mileage capacity placed by the builders at 100 miles on one charge, it weighs only 1,250 pounds and can show a speed of thirty miles an hour, it is asserted. The regular running speed, however, is eighteen miles, at which rate the vehicle should give fully sixty-five miles on one charge. It has a piano box body at the rear but at the front it has a dash and a large hood. It is equipped with wheel



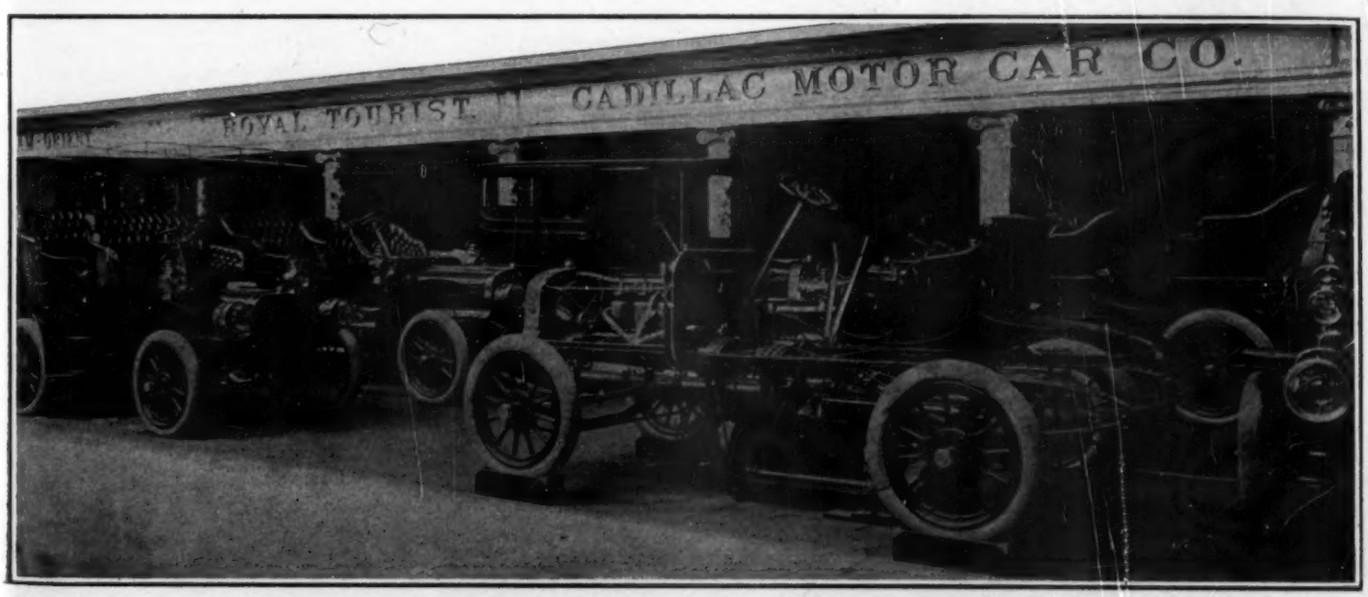
EXTENSIVE EXHIBIT OF KNOX AIR-COOLED CARS IN THE GARDEN SHOW. NEW 4-CYLINDER CHASSIS ON LEFT.

steer, 24-cell battery and motor hung in the body and driving by double side chains to the rear wheels. It has a wheelbase of 72 inches, full elliptic springs and the wheels are fitted with pneumatic tires, making this a most comfortable riding vehicle. The controller gives five forward speeds and two reverse. It has a folding buggy top.

The regular stanhope has a three-point suspension running gear with 2 1-2 horsepower motor carried on rear axle and cross member of the armored wood reach. The body is suspended in four full elliptic springs and carries a 40-cell battery in the rear giving fifty miles on one charge, it is said. Top speed is eighteen miles an hour. The new 1906 model stanhope has a longer body than the one already described, allowing of increased battery size to give sixty miles of travel on one charge. Another new design is a stanhope with folding auxiliary front seat resembling the familiar Stevens-Duryea and Knox supplemental seats. Two motors are hung on the rear axle and drive by spur pinions and internal gears to rear wheel drums. The running gear is like that of the other Babcock stanhopes, but steering is by wheel instead of tiller. The car carries forty-eight cells of battery, is geared to a maximum of twenty-two miles an hour and is expected to make a mileage of seventy-five on one charge under favorable conditions. This car is built only to order.

Cantono Electric Tractor Co.—Two Cantono electric forecarriages or tractors are displayed by this exhibitor, connected, one to a laundaulet and the other to a large opera 'bus. Both vehicles are of the regular horse-drawn carriage type, the tractor being substituted for the horses and the front wheels. The tractor provides the propelling and steering mechanism, electric motors being suspended on the single axle connecting its single pair of wheels, and a box above receiving the battery. In steering, one of the wheels is retarded or the other accelerated, so that the whole tractor turns. The tractor is an independent unit, attachable to any style of horse-drawn vehicle, including delivery wagons and trucks. The battery contains forty-four cells, and the motor is rated at 5 horsepower.

Matheson Motor Car Co.—Unfortunately positioned somewhat obscurely among the electric vehicle exhibits, the display of the Matheson company in the restaurant, nevertheless, attracts much attention. The main feature of its display is a 40-45-horsepower side-entrance touring car, with cherry-red and black body and bright red running gear. This is fully equipped, as regularly sold, with extension top, wind shield, horn, gas and oil lamps and generator, speedometer-odometer, gradometer, eight-day clock, Hartford suspension, folding baggage rack, auxiliary folding seats, and various other unusual conveniences. The mechanical features of the car are admirably shown by means of a separate 60-65 horsepower, four-cylinder Matheson motor, mounted on a stand, a flywheel and multiple disk clutch, which is a strictly new feature of the 1906 model; a section of one cylinder of an engine to show the cycle of operations, and also a sliding-gear transmission, mounted on a stand with the cover removed. The Matheson engine has valves in the top of the cylinder heads, actuated by rocker arms from a camshaft, carried along the sides



CADILLAC EXHIBITION CHASSIS AND 1906 LINE OF COMPLETE LIGHT AND HEAVY TOURING CARS IN THE GARDEN.

of the cylinder heads and bevel gear driven from the front end of the crankshaft. Ignition current is generated by a magneto, positively driven by spur gears. The water pump is belt-driven from a groove in the face of the flywheel. A ball governor on the fan shaft acts on the throttle. The inlet pipe is placed above the exhaust pipes on the same side of the cylinder heads, where the inrushing gas will be warmed. The carbureter is attached on a level with the tops of the cylinders, gasoline being pumped to it by a positively driven pump. Ignition is by make-and-break spark, and in connection with this is a self-starting feature that has been in use for two years.

La Société L'Electrique (Gallia Electric Carriages).—Spot-delivery sales have deprived this concern of two of the vehicles forming its exhibit, but two cars being in evidence—a two-passenger cab and a two-passenger Galliette. These vehicles have a traveling radius of fifty miles, with a maximum speed of from twenty to twenty-five miles an hour. The Galliette is one of the handsomest small electrics in the Garden, being upholstered throughout in red morocco, with falling top of the same. The body is by Rothschild. The Gallia cab has a Kellner body of front-opening (hansom) design, the upholstery being morocco of a rich black. Both models have, of course, electric front and side lamps. They resemble in general appearance small-powered gasoline cars, the Galliette having a front bonnet of the Panhard pattern, and the cab having one which closely follows the lines of the Renault. Samson tires are used on the rear pair of wheels, with Jenatzy tires on the front. Bernard Maurice Dufresne promises that the large landaulet which was sold to Mrs. W. K. Vanderbilt, Jr., will be replaced before the week's end.

Hewitt Motor Co.—The cars exhibited by the Hewitt Motor Co. have just been placed on the market and are new to the public. They embody a number of unusual features, but nothing that is of an experimental nature. The exhibit comprises a four-cylinder, 25-horsepower chassis, a single-cylinder, 10-horsepower chassis, a runabout, or "little touring car," on a 10-horsepower chassis, and a limousine, also on the 10-horsepower chassis. The 25-horsepower chassis has a four-cylinder vertical engine with all the cylinders cast in a single piece, including valve chambers and water jackets. There is no crankcase, the cylinders being supported on steel stanchions with diagonal braces at each end; the motor is placed in the usual forward position and is entirely enclosed by the hood, a steel pan underneath, a bulkhead at the front and the dashboard at the rear. The fan which draws air through the radiator is between the radiator and the front bulkhead; this arrangement prevents dust from reaching the open cylinders. Option is given on planetary or sliding-gear transmission; the sliding-gear gives three forward speeds. Drive is by shaft and bevel gears. A peculiarity of the Hewitt car is that there are three ways of obtaining the igniting spark—make-and-break with low-tension magneto, make-and-break from the battery current, and jump-spark with battery current and a Guenet French coil. Lubrication is by force feed. Framing is of pressed steel, and the springs have supplemental leaves, under compression, on top to minimize recoil.

The single-cylinder chassis has a horizontal water-cooled motor placed with the head of the cylinder toward the front of the car. A feature of this motor is that if repairs are needed it can be removed bodily in a very short time and another motor substituted. Drive is by single chain to the live rear axle; the transmission is of the planetary type, but has no internal gears. Framing is of pressed steel. Features of the motor are that is has a nickel-steel crankshaft with counterweights and flywheel flange forged integral; the flywheel is of steel; the camshaft can be removed without disturbing any adjustments and is of nickel steel; compression is 90 pounds to the square inch, which is true also of the 25-horsepower motor.

The "little touring car," on a special 10-horsepower chassis, has a curved box front in the top of which is the six-gallon gasoline tank; under the tank is a space in which a suit-case may be placed, while a small steamer trunk can be carried in a special compartment in the rear of the body. A buggy top and a rubber laprobe are furnished with each car. The body tilts back on hinges at the rear to give access to the machinery. All the Hewitt cars are fitted with flat-tread racing Michelin tires, although other tires will be furnished if desired. The limousine is roomy and luxurious, and fitted up with the equipment usually supplied with such bodies.

De Dietrich Import Co.—Tucked back in a modest corner of the restaurant is this exhibit of the American representatives of De Dietrich & Co., of Luneville, Paris. But one model of the 1906 line is shown—a chassis of the 40-45-horsepower car. In general appearance it resembles the 1905 chassis, but there are a few changes in details. For instance: there is but one camshaft, which operates both inlet and exhaust valves, in addition to the levers actuating the ignition magneto. All the valves are interchangeable, the inlet valves being on the same side as the exhaust, and are thus operated direct. The covers over the inlet valves form the ignition plates and are arranged to receive the ignition plugs. Mechanical drive lubrication has succeeded the 1905 leather-belt scheme, and gilled-tube radiators are used instead of the former honeycomb type. The arrangement of the throttle and carbureter is much simpler than in the 1905 model, and the tubing much more neatly arranged, so that access to the motor is greatly facilitated.

An entirely new change-speed gear, of the sliding-sleeve type, with gate motion for the speed lever, takes the place of last year's system, the locking arrangement being contained in a separate box from the change-speed portion of the gear. Metal-to-metal brakes are features this year, the side brakes being of the internal-expanding type. Pressure through the fuel tank for starting the motor is obtained by means of a small hand pump fixed to the dash, thus doing away with the small auxiliary tank similarly fixed. A few minor changes are also noted, the general tendency of which is to greatly simplify the details.

Commercial Cars in the "Exhibition Hall."

COMMERCIAL cars of various sorts and sizes occupy the bulk of the space in the basement—Exhibition Hall—of the Garden, and their solid, businesslike appearance is in keeping with the sober, not to say, subdued atmosphere of the place. Pleasure cars have always seemed misplaced in the basement, but the big business machines seem to belong there, with solid ground under their ponderous wheels.

Electricity and gasoline both are well represented; curiously enough there are five exhibits of each class, and the fact that many of the exhibitors of gasoline commercial cars are, comparatively speaking, newcomers in the field, shows to some extent the importance the power delivery wagon, truck and stage are assuming in the eyes of manufacturers whose whole attention was formerly devoted to pleasure cars, and whose ventures in the commercial field commenced with a pleasure car chassis fitted, perhaps, with a light delivery body.

Apart from the commercial cars, the basement contains a number of really interesting exhibits, which were unable to find room on the higher levels. These consist of automobile parts, materials and accessories which, notwithstanding their location, receive much attention.

Following is a résumé of the chief characteristics of the commercial cars exhibited.

Packard Motor Car Co.—The Packard Motor Car Co., of Detroit, Mich., exhibits a single gasoline truck of the type manufactured by this concern. The Packard is a good example of the modern gasoline truck for moderately heavy loads—about 3,000 pounds—and embodies several features of the Packard touring car, such as the lubrication system, the carbureter, the cooling system, clutch, transmission, brakes and so on, though the truck is designed throughout for its work and is in no sense an adapted pleasure car. The motor, which is rated at 14 horsepower, has two vertical cylinders of 4 1-16 inches bore and 5 1-8 inches stroke, cast together and placed below the driver's seat. Drive is through an expanding band clutch, three-speed sliding-

STANDS EXHIBITING THE WALTER (NEW YORK) AND STEVENS-DURYEA (SPRINGFIELD, MASS.) TOURING CARS IN THE GARDEN.

gear transmission and two side chains to the rear wheels. Framing is of wood re-inforced with steel; the rear wheels are 34 inches in diameter and the front wheels 32 inches, and all are fitted with 3 1-2-inch solid rubber tires.

H. H. Franklin Mfg. Co.—The commercial car exhibited by the H. H. Franklin Mfg. Co., of Syracuse, N. Y, embodies a number of features peculiar to the Franklin pleasure cars, but re-designed and strengthened for commercial work. The motor is the 12-horsepower four-cylinder air-cooled type used in the smaller Franklin pleasure cars, and is placed under the driver's seat and footboard with its crankshaft fore-and-aft; it is easily accessible for adjustment and repairs, and can be removed entirely without difficulty. Drive is through propeller shaft and bevel gears to the live rear axle; a specially designed sliding-gear transmission gives two forward speeds and reverse, the maximum speed being about twenty miles an hour. The truck weighs, light, 1,400 pounds and is rated as a one-ton machine, though, like most commercial cars, there is a good deal of leeway allowed for overloading without damage resulting. Wood framing is used, as in the Franklin pleasure cars; the wheels are all 32 inches in diameter, fitted with solid rubber tires; the wheelbase is 72 inches and the tread standard, 56 inches. The standard equipment is a platform body, to which any form of closed body, box body or other special arrangement may be added.

Studebaker Automobile Co.—Five electric vehicles—trucks and delivery wagons—are exhibited by the Studebaker Automobile Co., of South Bend, Ind. The largest of these machines is a stake truck weighing, light, 9,000 pounds and having a rated carrying capacity of three and a half tons. A panel-side delivery wagon weighs 5,000 pounds and carries 2,500 pounds. There are three vehicles of 1,000 pounds capacity each; a panel-side delivery wagon, an open express wagon and a stake truck. All these machines are equipped with Exide batteries supplying current for two motors, one motor driving to each of the rear wheels through

SMITH & MABLEY'S EXHIBIT OF FRENCH AND GERMAN IMPORTED CHASSIS AND COMPLETE CARS AT THE GARDEN SHOW.

sprockets and chains, thus making it possible to use a solid rear axle and dispense with a differential. Solid rubber tires are used on all wheels.

Knox Automobile Co.—The Knox Automobile Co., of Springfield, Mass., exhibits four machines, two of which earned a rest in the Garden by carrying Knox pleasure cars from the freight yards to the show. Motors of the Knox cars are all air-cooled by the grooved pin system long used by this concern, and are exceedingly substantial vehicles. The largest machine shown, in point of carrying capacity, is a three-ton stake truck which weighs, light, 4,800 pounds and is fitted with a double-opposed cylinder motor rated at 16-20 horsepower hung under the body and driving through a two-speed planetary transmission and heavy side chains to the rear wheels. The regular maximum speed is 10 miles an hour, though higher gears may be used if lighter bodies are fitted. This chassis may be had with sight-seeing or omnibus bodies. The same motor is fitted to a delivery or express wagon of 2,500 pounds capacity, with open body and standing top; this machine has a maximum speed of 18 miles an hour and can be had with either lever or wheel steer. The smallest car shown is a light delivery wagon, having a carrying capacity of 1,500 pounds; this is fitted with a single-cylinder motor of 5 inches bore and 8 inches stroke and has a maximum speed of 18 miles an hour. A large vehicle is the transportation 'bus of a type built for the West Indies Transportation Co. This car is fitted with a 16-20-horsepower double-opposed motor and has a carrying capacity for 28 passengers. The maximum speed is 10 miles an hour.

Olds Motor Works.—The name Oldsmobile has become so thoroughly identified with the light and nimble curved dash runabout that it does not seem to fit the heavy delivery wagon exhibited by the Olds Motor Works, of Lansing, Mich. The wagon has a carrying capacity of one ton and is driven by a two-cylinder vertical motor of 16-horsepower, which drives through planetary transmission and side chains to the rear axle. The machine has a maximum speed of 16 miles an hour. Pressed steel framing is used; the wheels are 30 inches in diameter and are shod with 4 1-2 inch solid rubber tires. In the standard vehicle, which has a box body with wire-screened sides and top, the carrying space is 66 inches long, 58 inches wide and 43 inches high. The engine is placed under the driver's seat with its shaft across the frame, and is water-cooled; the radiator, which is distinctive in appearance, is placed in front of the dashboard and extends from the top of the dash to the frame of the car, providing ample surface for cooling when the motor is working hard. This chassis can be fitted with a ten-passenger 'bus body. The exhibit consists of a chassis, an express wagon and a closed body delivery wagon, the mechanical features being alike in all cases.

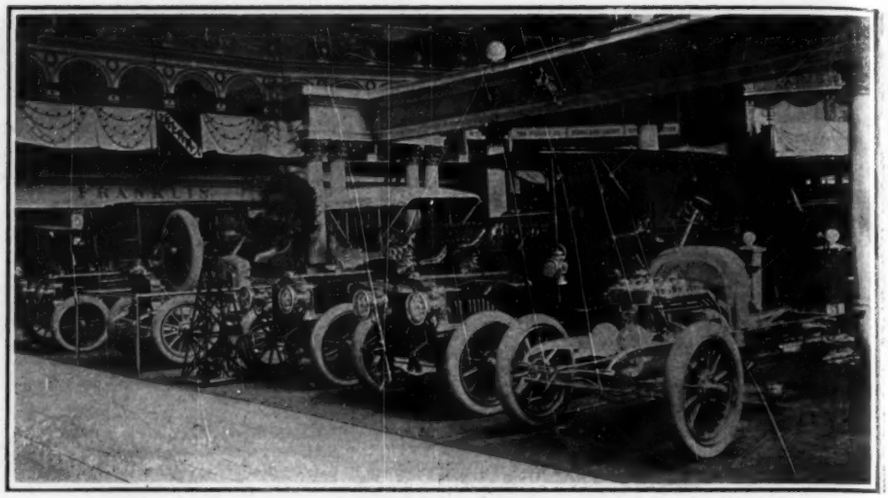
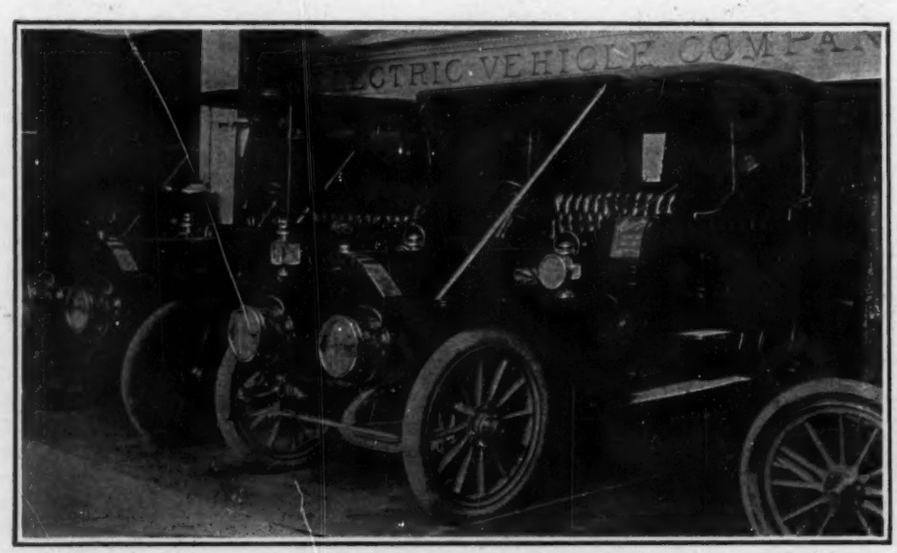


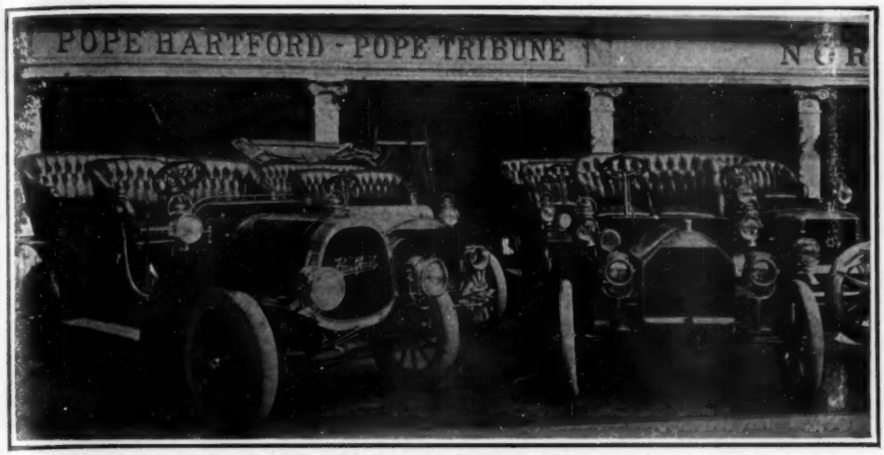
EXHIBIT OF THE "THOMAS FLYER" TOURING CAR IN THE GARDEN SHOW.

Pope Motor Car Co.—Electric trucks and delivery wagons are exhibited by the Pope Motor Car Co., of Indianapolis, Ind., manufacturers of the Waverley electric vehicles. Of these the heaviest is a three-ton truck built with platform body, heavy storm-proof top and side curtains, built for all-round heavy trucking. Two motors drive the rear wheels by side chains. The total length of the vehicle is 16 feet 5 inches, and the loading space is 13 feet long, 4 feet 6 inches wide and 6 feet high. A special one-ton truck exhibited has a broad, low platform extending out over the wheels, and is adapted to the handling of bulky loads. The length over all is 15 feet and the clear carrying space 10 feet long and 6 feet wide. A closed delivery wagon shown has a capacity of 1,200 pounds and is driven by a single suspended motor, double reduction gears, jackshaft and side chains. The loading space is 5 feet 2 inches long, 3 feet 4 inches wide and 4 feet 8 inches high. The lightest machine in this exhibit is a light delivery wagon with a capacity of 800 pounds. This is an open-body wagon with a carrying space of 5 feet 3 inches long and 3 feet wide, and is driven by two motors, each of 3-horsepower.

Pope Manufacturing Co.—Commercial car exhibit.—One model is shown of the new Pope gasoline truck, the distinguishing feature of which is the magnetic clutch regulated by a small electric controller at the left of the driver's seat and operated by the driver's left hand. This controller is identical in construction with the Standard trolley controller and connects the generator with the various clutches required to give the different speeds. The motor is a two-cylinder horizontal opposed engine, water-cooled by thermo-syphon system, and developing 20-24 horsepower. It is set crosswise under the driver's seat, transmitting its power direct to a countershaft through the magnetically operated friction clutches, encased and running in oil, giving three speeds forward and one reverse. Current is furnished by a small generator directly driven by the engine. The truck has a load capacity of 4,000 pounds, and sixty-eight square feet of load floor space is provided. Removable sections are provided in



GASOLINE CARS IN ELECTRIC VEHICLE COMPANY'S GARDEN EXHIBIT ON MAIN FLOOR.



POPE-HARTFORD AND POPE-TRIBUNE TOURING CAR MODELS IN THE GARDEN.

the floor, and the motor and working parts are so constructed that they can be readily removed in case of accident or breakage. The wheelbase is 96 inches, gauge 63 inches.

Hewitt Motor Co.—A new car to the American public is the machine built by the Hewitt Motor Co., of 10 East Thirty-first street, New York. Though of American design this machine has heretofore been built only in England, where it is said to have met with a large measure of success. This is a gasoline car, and two types are shown, one with a single-cylinder horizontal motor of 10-horsepower, and the other with a 4-cylinder vertical motor of 25-horsepower. The smaller car is intended for delivery work and the like, and has a rated carrying capacity of 1,000 pounds, which, however, can be considerably exceeded without danger. The larger machine is of the heavy truck type, having a rated carrying capacity of three tons, though the tare of the machine is but 3,000 pounds. The motor, placed in front between a steel pan and a steel cover, has an open base and is supported on steel pillars. Three separate systems of ignition are fitted and the lubrication is entirely automatic. Framing is of pressed steel of very deep section; transmission is planetary and the drive by side chains. The motor of the smaller car can be removed, with its sub-frame, by taking out four bolts for making repairs, so that another motor can be placed in position and the car used while the repairs are being made.

A chassis only of the large car is shown; a chassis and also a complete closed delivery wagon of the 10-horsepower type are exhibited.

Vehicle Equipment Co.—A large space is occupied by the exhibit of electric trucks and delivery wagons of the Vehicle Equipment Co., of Long Island City. Six machines in all are shown, all of the regular stock patterns manufactured by this concern. The largest is a huge five-ton hoist truck, having attached a windlass operated by an electric motor which draws its current from the batteries of the car. Next in size is a three-ton truck of a type frequently used for heavy brewery work; this machine is shown loaded with beer kegs. Besides these there are a two-ton truck and three delivery wagons, the latter having rated carrying capacities of one thousand pounds, two thousand pounds and three thousand pounds respectively.

Electric Vehicle Co.—Columbia electric commercial vehicles are exhibited by the Electric Vehicle Co., of Hartford, Conn. As is the case with most of the exhibits at the Garden show, there is plenty of room at the Columbia space to inspect the machines. The exhibits consist of a three-ton truck, a two-thousand pound express wagon with top, a one-thousand pound delivery wagon and a delivery wagon of two thousand pounds capacity, of a type used by electric light companies in New York and

EXHIBITORS' DEMONSTRATION CARS LINED UP ON FOURTH AVENUE IN THE REAR OF MADISON SQUARE GARDEN.

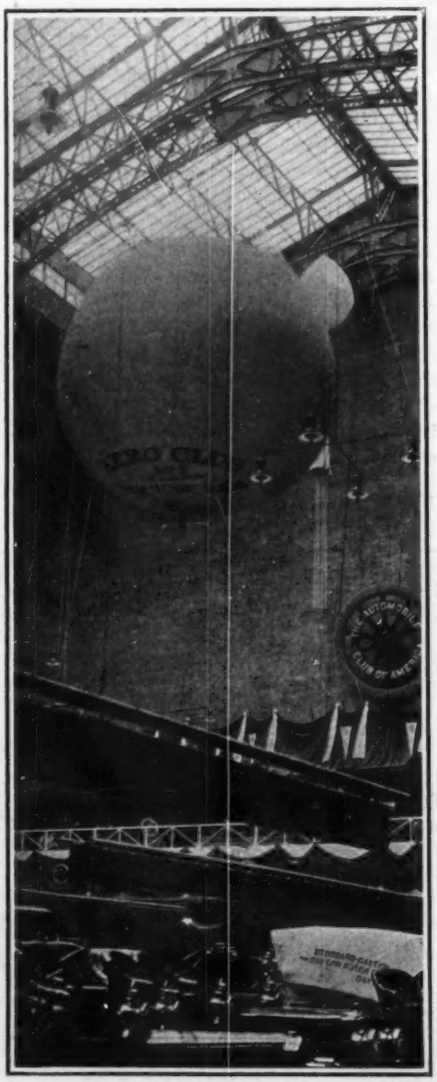
other cities as lamp wagons. The manufacturers state that one firm in New York uses fifteen Columbia delivery wagons, and that the wagons average 35 miles a day in regular service. The various chassis are furnished complete with power and ready to run, but without body when so ordered; the chassis are so arranged that any good wagon builder can make and attach a body of any desired kind. Bodies are furnished if ordered. All batteries are placed on trays and automatic contacts are provided so that batteries can be lifted in and out without trouble or delay. All are fitted with Exide batteries.

CARS AND AIRSHIPS AT THE ARMORY.

IT is no secret to Eastern motorists that the automobile industry has outgrown the bounds of the largest exhibition hall in New York City. For the past two years this has been increasingly evident, but the difficulty heretofore has been to find a satisfactory line of division between the two shows which has evidently become necessary. Last year it seemed as if a satisfactory division might be found along lines determined by the origin of the cars exhibited, and accordingly an ambitious exhibit of imported cars was held in the large showroom over the new Macy store. Artistically that show was an undeniable success, and without doubt it had the beneficial influence on sales but not in point of attendance. However, the show was something of a disappointment and the reason for this appeared to be traceable to the necessarily limited number of purchasers in the market for the very high class and expensive cars of which this exhibit was entirely composed. Put cars of the highest possible grade in the same showroom with cars which come within the reach of the average man, and the average man, after selecting a car suited to his purse, will invariably make a trip through the stands of the more expensive cars for his own education and benefit. Put the two classes of cars in separate buildings some distance from each other, and charge a separate admission to each, and it is the exceptional man rather than the average man who will visit the show in which he is not directly interested for the simple purpose of improving his mind.

Unless the indications of the opening night belie the facts of the situation, this year has afforded a most happy solution of the difficulty by giving the Automobile Club of America, under whose sole auspices the first three Automobile Shows were held in New York and apparently once more to enjoy undivided honors and to offer the public in its own "Club Show" a large number of cars suited to the resources of the average man, and also a considerable number of cars of the highest possible grade and national or international reputation. More than this the additional floor space gives unwonted opportunity to many interesting novelties in automobile construction, which, but for the ampler floor space available would either have refrained altogether from exhibiting, or have exhibited under most unfavorable conditions.

From the standpoint of the public likewise the change deserves a warm welcome. Last year Madison Square Garden was crowded to the extreme limit with cars, and it was utterly impossible for visitors to move from stand to stand after 2 or 3 o'clock in the afternoon with anything resembling physical comfort, much less adequate opportunity to observe mechanical



SPHERICAL BALLOON EXHIBITED BY AERO CLUB AT THE ARMORY.

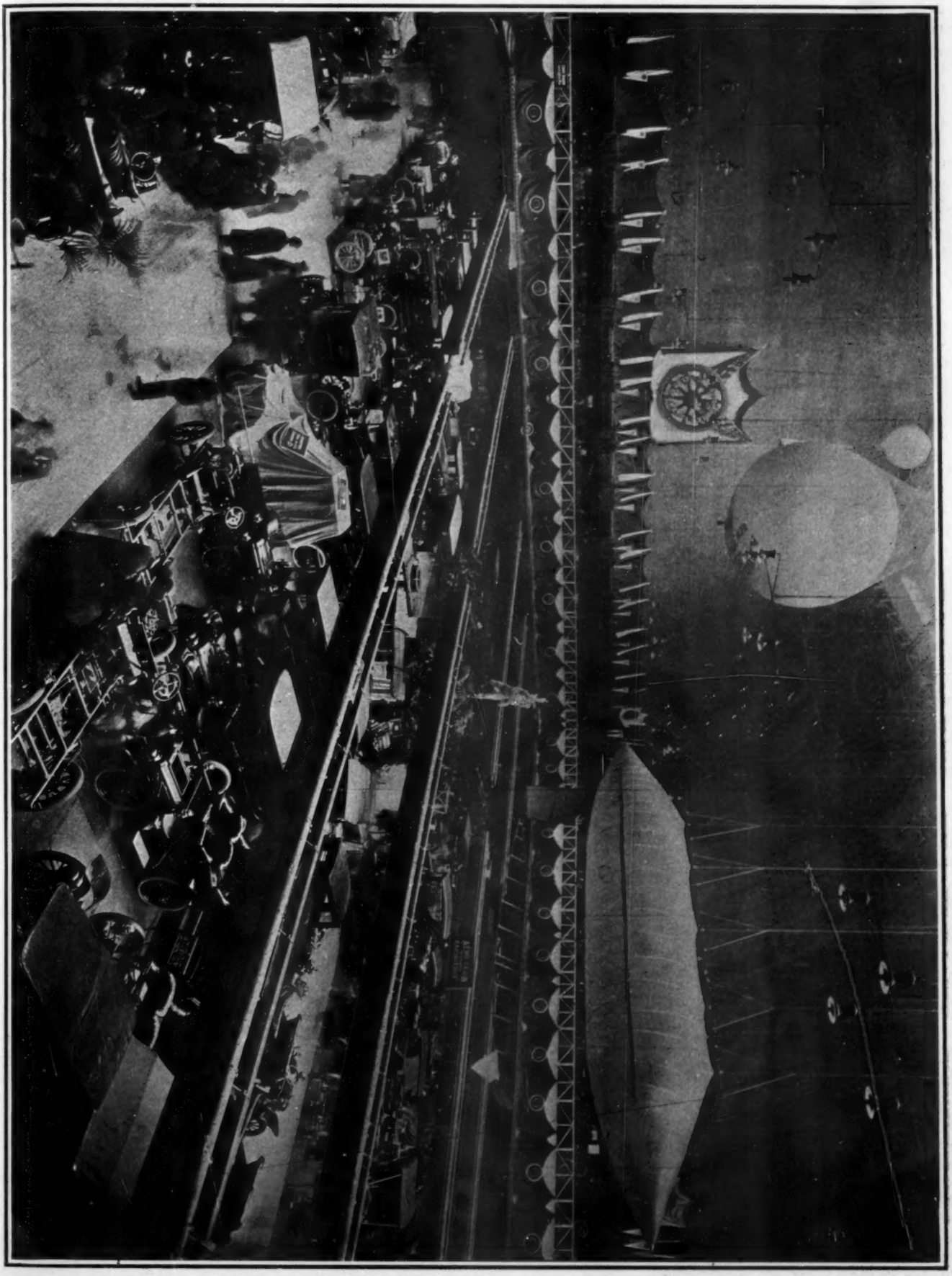
details and ask questions. It may be supposed that when exhibits are divided as they are this year every one with any live interest in automobiles will visit both shows, but the practical division of the total number of visitors at any one time into two will give every one twice the chance for really seeing the cars and twice the comfort.

The Club's ownership of the Armory Show was pleasantly in evidence on Saturday afternoon, when the Armory, on whose exhibits a small army of workmen was still busy putting the finishing touches, was thrown open to members of the Club and their invited guests, and in the latter portion of the afternoon, even before the cover slips had been removed from many of the machines, and while others were in the process of being hauled up an inclined plane, constructed on the steps of the Lexington Avenue entrance, there was a large attendance of both gentlemen and ladies, the latter handsomely gowned and taking a lively interest in the cars on view, the former in correct afternoon attire with boutonières and canes, and an air of satisfied proprietorship.

As was natural these privileged visitors directed their chief attention to the higher priced machines. The handsome limousine and landaulet bodies of many of the cars were each centers of attraction of interested groups, and the polished chassis on many stands were surrounded by men (mostly unaccompanied by ladies), who had availed themselves of that opportunity to gain facts for possible reference later on when their better halves should arrive and attempt to direct the expenditure of their money.

Before 8 o'clock, the hour of the public opening, had arrived, the cover slips had been removed and it was possible to get an idea of the effect presented by the ensemble; it was in truth artistic to a degree. The blank whiteness of the just finished armory walls had been covered with hangings of a soft olive green and the floors were covered (except the aisles) with green denim of the same shade. Green was also the color of the signs over the stands, both on the main floor and on the balcony.

The signs were uniform in style and height as well as in color. Each was lettered in gold and bore the Club's badge in gold silhouette at each end. Around the balcony at intervals of 20 feet or so were affixed wood models of the Club's badge, an automobile wheel with the letters "Automobile Club of America." Each wheel is about 30 inches in diameter, and is painted red with the tire in slaty rubber color and the lettering on a gold ribbon. At night the Armory is brilliantly lighted by arc lights and by day it receives a splendid diffused light through glass which covers the upper portion of the great arch in which the roof is formed. It may be doubted if any other public building in New York is as well lighted.



BIRD'S-EYE VIEW OF INTERIOR OF SIXTY-NINTH REGIMENT ARMORY, WHERE THE AUTOMOBILE CLUB OF AMERICA'S SHOW IS IN PROGRESS.

Nearly all the rooms adjoining it on the main floor were utilized excepting only those with doors too small for machines to be run through them. The basement also was utilized and in the gymnasium on the third floor was an exhibit of the Aero Club of America.

Upon entering the main hall from Twenty-sixth street, one sees directly in front a small balloon from which hangs a parachute. Near the center is a small airship, also a large gas balloon. These are all the work of Leo Stevens, the well-known New York aeronaut and balloon constructor. Near the Lexington avenue end of the main hall is a small balloon with basket and net attached. This latter was constructed by Morris Mollet, of Puteaux, near Paris. It is nearly an exact duplicate of the *Brazil*, the first balloon or airship ever owned by Santos Dumont. These balloons are inflated with air, and suspended from the roof of the main hall, they attract a good deal of interest from the visitors. The most interesting part of the exhibit, however, is in the gymnasium; this is at the Lexington avenue end of the building, one flight above the gallery.

On Sunday, while the Stevens air ship was temporarily lowered to the floor for the purpose of increasing the support by which it was suspended, a workman up aloft dropped a pulley block, which, fortunately, missed the few spectators and workmen around the airship, but tore through the varnished silk of the gas bag, making an irregular rent several feet long. Mr. Stevens said that to repair the rent properly so as to make the gas bag safe for an ascension it would be necessary to cut out and replace one of the sections of which the gas bag was built up. A temporary repair was made, however, and in a few hours the airship was again swung aloft.

In several cases expected cars had not arrived on the opening night, and consequently a fuller report of these exhibits will have to wait for a subsequent issue. Following is a summary of the cars shown at the opening of the shows on the main floor:

Thomas B. Jeffery & Co.—The Rambler exhibit comprises a striped chassis of the new 40-horsepower Model 15 car, with four-cylinder vertical engine and sliding gear transmission. The complete cars are as follows: One 40-horsepower Model 15, with Cape cart hood; one 25-horsepower Model 14, with Cape cart hood; one Type 3, two-cylinder opposed 18 horsepower; one Type 1.

Of these the Type 1 is substantially the same as last year with a few improvements in detail. The Type 3 car has a slightly larger engine, a larger body, and 100-inch wheelbase, but otherwise is quite similar to the Type 1.

The two new cars which were lately described in these pages differ from each other mainly in the matter of dimensions, and in the fact that the smaller car has propeller shaft drive, while the larger has side chains. As these cars were so lately described it will be unnecessary to repeat at this time, but the following mechanical features of interest were noticed:

Instead of a ball-thrust bearing to release the clutch, beveled rollers are used, a large roller on the thrust collar and a pair of small rollers on the ends of the fork. The clutch itself has its spring and bearing portions entirely enclosed and an oil cap is provided by moving which a quantity of oil can be injected, which will last for some time. The front axle is of very heavy tubing and is stiffened by a straight strap running vertically through its entire length and brazed. The engine has a three-point support, being hung from a cross member of the frame between the flywheel and the crankcase, and at its front end having two arms which rest on diagonal brace members of the frame. The steering knuckles have ball-thrust collars to take the weight.

An interesting feature of the 25-horsepower car is the rear axle construction. The central casing surrounding the differential and bevel gears is of aluminum, but the axle proper has two large steel tube sleeves in which the shafts run. The inner ends of these tubes are grooved in a lathe, and also drilled at intervals, and when the mould for the aluminum casting is to be poured these tubes are introduced in the mould and the aluminum poured around them.

The propeller shaft of this car runs inside a tubular sleeve, and has no universal joint at its rearward end. The sleeve is braced by diagonal stayrods which run from one end of the rear axle to the forward end of the sleeve, which terminates in a large malleable iron casing, from the sides of which project studs which enter holes in a bracket projecting downward from a cross-member of the frame. In this manner all strain due to the movements of the rear wheels is prevented from communicating to the forward universal joint, which is located inside the casing just mentioned.

Rebound and breakage of springs is insured against by a special Rambler feature, which is an extra spring leaf stop on all of the ends of the springs and having at its ends lugs bent up to clip the two longest leaves of the spring proper. In this manner three spring leaves are provided instead of one, as usual, to take the rebound.

Baker Motor Vehicle Co.—The Baker exhibit comprised the following: One "Suburban" runabout, which is something of a novelty in electric vehicles in that the motor, which is of the ironclad type, is hung under a bonnet at the front of the car and drives the rear axle through a long propeller shaft and bevel gears. The brake drum is mounted on this propeller shaft under the rear axle, and there are independent brakes on the rear wheels. The car has a battery of 24 cells and is rated at 40 miles on one charge.

One "Stanhope," with the motor near the bonnet and driving through a sprocket chain, this being the familiar Baker arrangement. One Baker "Imperial" runabout, with chain drive and folding top. Two Baker broughams, one driven from the interior and having no outside seat at all, and the other operated by a driver from an elevated rear seat. Both of these have the ironclad motor and propeller shaft transmission noted in connection with the Baker "Suburban." All these vehicles are rated at 40 miles capacity. The "Stanhope" and "Imperial" carry 12 cells of battery and the others 24.

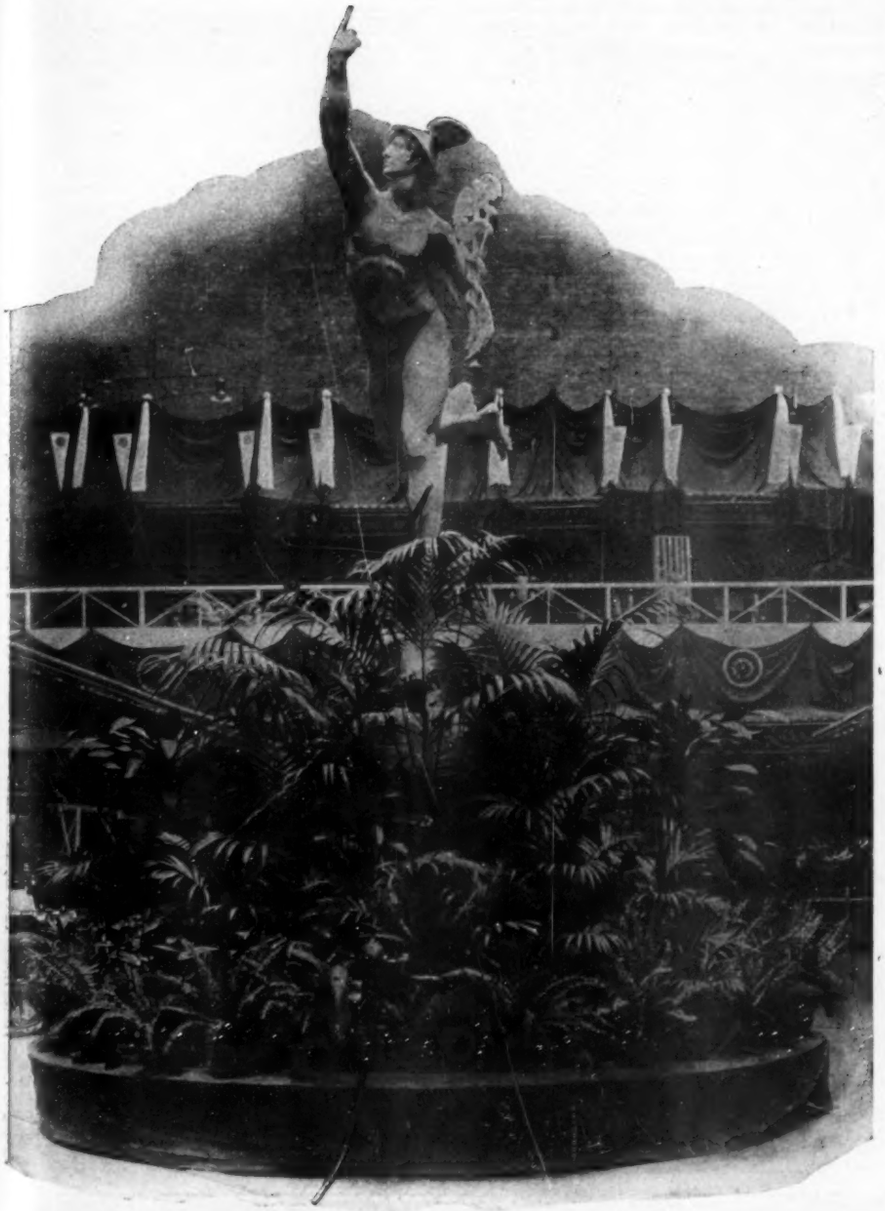
Grout Bros. Automobile Co.—No steam vehicles are shown this year by the Grout concern, but instead a four-cylinder gasoline car built with two styles of body, a runabout and tonneau. A stripped chassis is shown, from which it is seen that the valves are all on the same side of the engine, and the cylinders, which are of 4 1-2-inch bore by 5-inch stroke, are cast separately. The engine and gear box are on a false frame on the same level as the main frame, which is of armored wood and not tapered at the ends. The transmission is by sliding gears and gives three speeds with direct drive on the third. Phosphor bronze bearings are used in the gear box and these depend entirely on internal splash for lubrication. All the brakes act on the rear wheels. The pedal actuating the internal shoes and the side lever the external. Both sets of brakes are double-acting and neither is enclosed. Adjustable ball bearings are used in all the wheels.

The radiator is supported on a long piece of angle iron riveted to the front cross-member of the frame. It is not of the built-up type but the circular air tubes are soldered into the front and back plates. The lubrication is by Dodge positive oiler, which has single plunger pump and a rotating valve which delivers the oil from the pump to six oil pipes in order.

Lozier Motor Co.—The exhibit of the Lozier Company comprises one polished chassis, one touring car with Victoria top, color, dark blue, and one landaulet limousine, color, black.

The principal changes in the 1906 Lozier cars are that the cylinder sizes have been slightly increased, being now 4 5-8-inch bore by 5 1-2-inch stroke. Ignition is by Simms-Bosch high-tension magneto with battery and coil as reserve. Separate sets of plugs are used. The transmission has four speeds, instead of three as last year, and drives direct on the fourth. From the gearcase transmission is by side chains to the rear wheels. Standard roller bearings are used in the gear box.

A special point is made of the character of the engine crankshaft which is of 30-point steel with all bearing surfaces hardened by the cyanide process. Especial care is taken to prevent warping during the hardening process, and the bearings are finally trued by grinding. Owing to the



CENTERPIECE ON MAIN FLOOR OF THE ARMORY AT THE CLUB SHOW.

shaft surfaces being thus hardened the makers state that it becomes practicable to use phosphor bronze bushings which would otherwise be liable to cut if the oil feed for any reason became reduced. The bushings are grooved diagonally and grooves filled with babbit metal, the intention being that, if the bearings cease to receive sufficient oil, the babbitt will expand from the heat sufficiently to lift the shaft clear of the bronze and cause it to run on the smoother surfaces of the babbitt. At all events it is sufficient to say that the bearing runs with less friction, on account of the babbitt, under ordinary working conditions.

Daimler Manufacturing Co.—The good impression made by the American Mercedes last year when, for the first time, its makers undertook to produce an exact copy of the German car, will suffer no reversal from examination of the 1906 car. A polished chassis is shown with a mirror beneath and with sections cut away from the cylinders, crankcase, and pistons to show the internal working of the engine. The axles are jacked up so that all the wheels are free to turn. The principal changes in the engine are the use (as in the German car) of ball bearings on the crankshaft, and a considerable increase in the size of the inlet and exhaust valves. Minor changes are seen in the location of the 2 to 1 gears, the form of the water jackets and the arrangement of the igniters on the valve chambers. The clutch is now enclosed and runs in a bath of oil and slightly loose joints are interposed in the main driving shaft between the clutch and the transmission gears. The transmission gears are slightly increased in diameter, though not in width of face, but a new feature is the use of direct drive on the high gear. This is accomplished without the necessity of driving through two pairs of gears on the other speeds by using two sets of bevel pinions and gears, of which only one is transmitting power at a time. One pinion is on the driving gear shaft and the other on the jack shaft.

The construction throughout is somewhat heavier than last year, the connecting rods afforded, perhaps, as striking an example of this is anything. On the other hand the increase in efficiency of the engine through the use of ball bearings and larger valves ought easily to take care of the increase of 15 per cent. or thereabouts in total weight. The bore and stroke are the same as before, and the rating remains the same likewise, though the actual power will doubtless be greater.

Maxwell-Briscoe Motor Co.—Seven attractively staged models of the Maxwell make up the exhibit which is well located in the center of the main floor. The double-opposed 16-20-horsepower touring car, finished in Brewster green with black and gold trimmings, is shown with cape top with celluloid front. There is also a 16-20-horsepower chassis in polished steel, with inside of frame, piping, etc., enameled red by way of contrast; the standard Tourabout, 10 horsepower, with falling top, has pressed steel frame, a feature set forth prominently in a chassis exhibited alongside. A "Gentleman's Speedster" is finished in bright red with black trimmings, and differs from the Tourabout in several particulars, having divided seats and 30-inch wheels; it is sold with a guarantee to make a mile in 1:18. The "Doctor Maxwell," designed especially for physicians' use, has a special body with falling top and 16-20-horsepower motor. A chassis of the same horsepower is also equipped with a roomy delivery wagon body of 1,000 pounds carrying capacity, finished in cream color with bright green and black trimmings. The special feature of the new 40-horsepower vertical four-cylinder touring car on exhibition is that the engine and transmission comprise a unit with integral cases which, the makers assert, assures alignment of transmission with motor at all times. In this car the thermo-syphon system of water circulation is used. The car is shaft-driven and has internal and external brakes and a special emergency brake acting on the differential. The oiling system is automatic, a pump integral with the motor making distribution of all working parts, no check valves or sight feeds being used. A 16-20-horsepower truck with capacity of 3,000 pounds is demonstrated on the streets, as is also a large touring car. All Maxwell cars have three-point suspension and shaft drive, and no stay or strut rods are used.

Premier Motor Manufacturing Co.—Four air-cooled machines are shown. The Model L de Luxe is a 20-24-horsepower four-cylinder vertical engine touring car, with shaft drive, equipped with torsion rod connected at one end to the differential housing and at the other end to the middle cross member of the main frame, at which point a heavy helical spring is placed at the

end of the rod to cushion the vertical thrust and ease the strain of the differential. A seven-plate clutch of hard and soft steel is used, and three-speed and reverse sliding gear. Model L is also shown with limousine body upholstered in goatskin, and with all the latest embellishments. Model F, with a 16-horsepower four-cylinder transverse motor, has planetary transmission and chain drive. The same motor is applied to a physicians' special carriage, which is shown with a phaeton top. A nicely finished polished steel chassis of 20-24 horsepower completes the floor exhibits, and two demonstrating cars are in active service on the street during the show.

National Motor Vehicle Co.—The leading feature of this exhibit is Model D, the four-cylinder vertical 35-40-horsepower machine that won the 100-mile stock-car race at Indianapolis on November 4, 1905, reducing the circular track record, and which, on November 16-17, 1905, in a trial against time for twenty-four hours, broke the 150-mile record and all records from 650 miles to 1,050 miles and the twenty-four hour record by 78 9-16 miles. Model E, a six-cylinder 50-60 horsepower touring car, with 121-inch wheelbase, which carries seven passengers, all facing forward, is another feature. The tonneau is equipped with a special folding seat and holds five of the seven occupants. Limousine bodies are furnished with either of the above models if desired, in either aluminum or wood. A Model E with aluminum limousine body in royal blue finish is shown. An exceptionally well finished polished chassis of Model D, with cylinders brass plated, lends a rich effect to the exhibit. Two steel demonstrating cars, models D and E touring cars, are in use during the week.

Panhard and Levassor.—This exhibit comprises six complete cars and a Quimby aluminum body in the rough. This body is a demi-limousine with side entrance and has two folding seats in the tonneau which face forward, so that the total passenger capacity is seven. A folding luggage rack is provided at the rear. The complete cars include: One 15-horsepower limousine body by Rothschild, color, maroon; one 11-horsepower limousine body by Binder, Paris, color, blue with yellow stripes. Both are called "town" cars by the exhibitors and differ from the regular limousine in that the top, although it projects over the front seat, does not extend forward to meet stanchions rising from the dash, nor is there any swinging glass front such as the regular car has. One 18-horsepower limousine body, by Labourdette, color, green; one 24-30 horsepower Pullman limousine body by Demorest, color, green, with yellow running gear. The car seats seven passengers, the extra tonneau passengers being provided with swivel seats on stationary bases. One 35-50-horsepower open tonneau for seven passengers, extra seats being of the Pullman variety already mentioned; one 50-horsepower open tonneau for seven passengers, in this case the extra seats being stationary; the body is by Mühlbacher, color, maroon with narrow vertical stripes. This car has a distinctive appearance owing to a square tube honeycomb radiator quite like that of the Mercedes car, but made by C. J. Megevet, of Geneva.

The 1906 Panhard, in sizes from 24-horsepower up, has ball bearing crankshafts and the magneto is mounted on the crankcase and driven by gears instead of being carried on the dash and driven by a chain. The gearcase is supported directly on cross-members of the frames, which is likewise a departure from previous Panhard practice.

Renault Freres Agency, Inc.—This exhibit comprises, besides a polished 20-30-horsepower chassis, two complete cars:

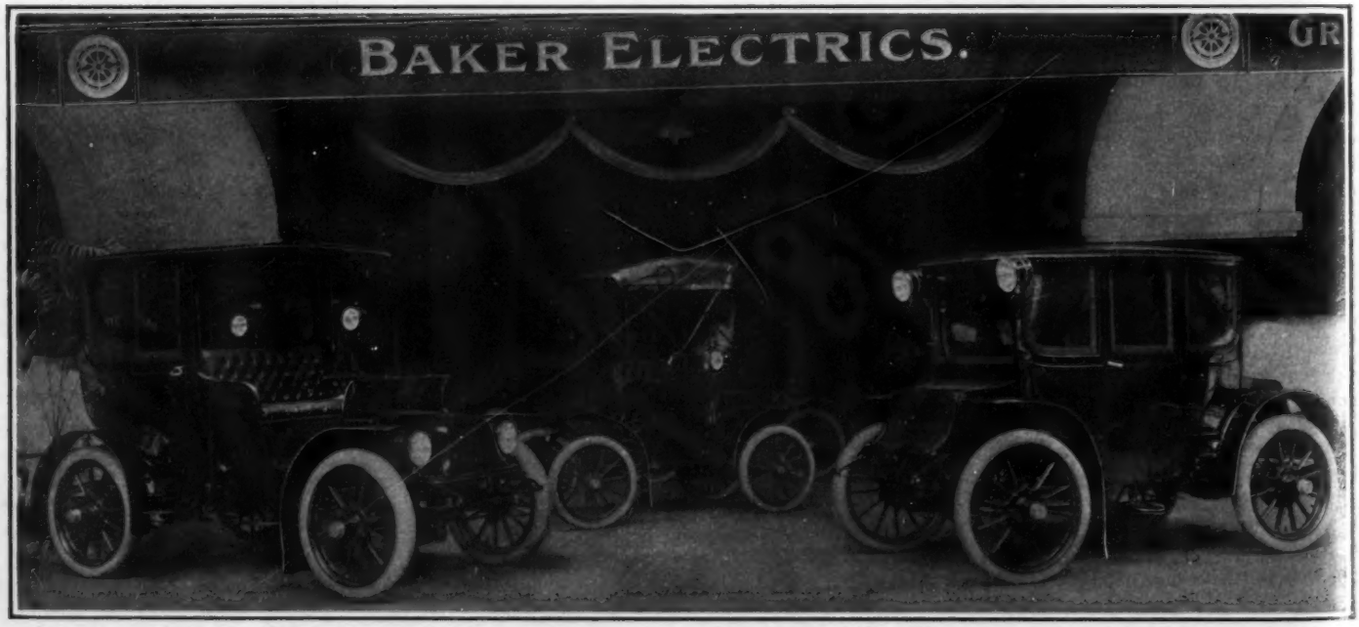
One 10-horsepower four-cylinder landaulet body by Rothschild, color, dark red, capacity two passengers inside, two outside.

One 10-14, four-cylinder landaulet body by Kellner, color, dark green with vertical stripes. Capacity two inside passengers with vis-a-vis folded seat for a third, and two outside passengers.

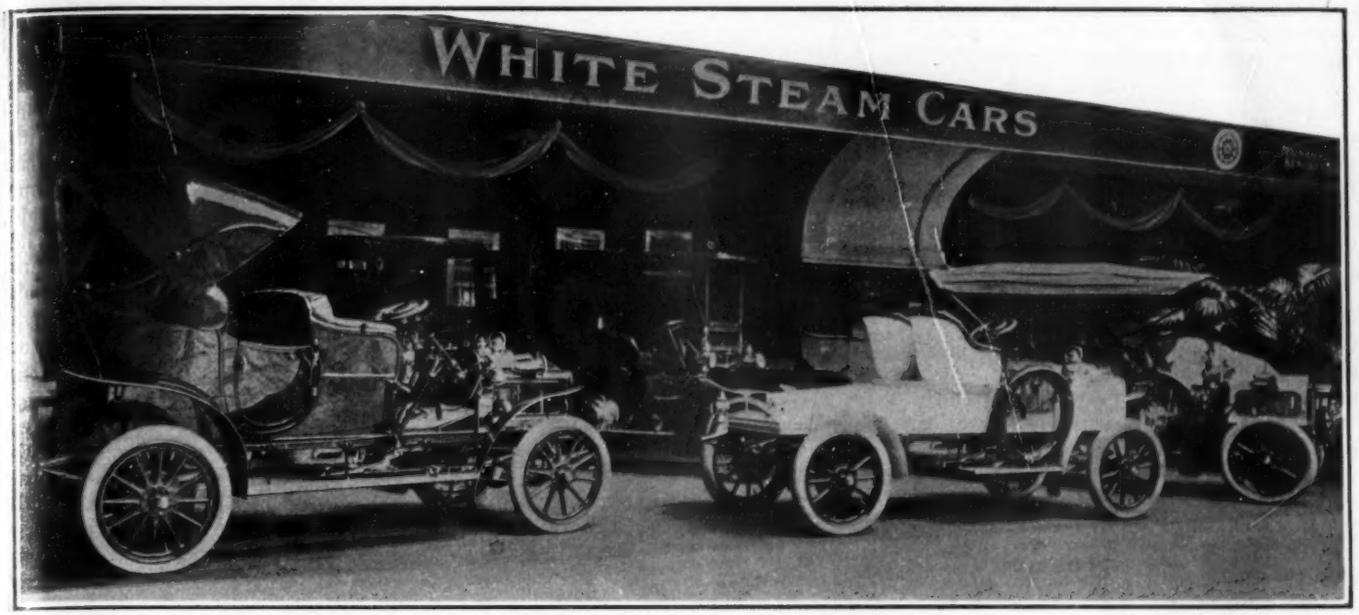
The Renault for 1906 shows only slight changes in detail from the car last year. The gear box is now rectangular in shape and is no longer compressed into such exceedingly small compass as it was two years ago. The foot brake is of extraordinary size, and is located this year just back of the gear box, not at the forward end of the bevel pinion shaft adjacent to the rear axle, as it formerly was. The brake is of the internal expanded type. All the foot levers are carried forward in longer sweeps from a shaft mounted across the top of the gear box. Ignition is by Simms-Bosch high-tension magneto. The rear axle has two steadying rods, one from the top and the other from the bottom of the case surrounding the differential, and both meeting in a single forging which is guided by a bracket depending from a cross member of the frame. Compression springs above and below serve to give it a slight cushioned movement.

Palais de l'Automobile.—This exhibit comprises Renault, Panhard and Delaunay-Belleville cars, including:

One Renault, 20-30 horsepower, Victoria top car with extension curtain from the front of the Victoria top to stanchions springing from the dashboard. The body is by Rothschild, color, blue; one Panhard limousine of about 20 horsepower, body by Rothschild, color, maroon; one Panhard lan-



ELEGANT EQUIPAGES COMPRISING THE BAKER ELECTRIC 1906 PLEASURE MODELS ON EXHIBITION AT THE ARMORY SHOW.



WHITE STEAM CARS WITH OPEN, CLOSED AND SEMI-ENCLOSED BODIES ON VIEW IN THE ARMORY SHOW.

daulet limousine of 30 horsepower, body by Rothschild, color, black. Its inside seating capacity is three on rear seat with folding vis-a-vis for two more; one Delaunay-Belleville 40-horsepower car with canopy top; capacity, seven passengers; one 20-horsepower Panhard chassis not polished; one Delaunay-Belleville 40-horsepower chassis not polished.

The Palais de l'Automobile shows the only '06 Panhard chassis at the Armory Show. It is not greatly changed as regards the motor, save in the important respect that ball bearings are used on the crankshaft; but the new gear-case is supported on cross-frame members, centrally at the front end, and just forward of the differential, by two spreading arms. The skeleton construction which formerly characterized the gear-case has been abandoned for the more usual style. Ball bearings are used throughout.

The Delaunay-Belleville embodies decidedly more novelties of construction than any other of the imported cars. There is space here for only brief mention of them, but the principal features are as follows:

The radiator is circular in form and the dashboard is rounded to a radius slightly larger than that of the radiator. The gasoline tank is directly back of the dash and the steering column, and apparently various control members also pass right through the tank. It is protected by boards from accidental injury. The toe board slopes rather sharply up to the tank.

Although the engine was stated to develop 40 horsepower it looks more like 50 or 60 horsepower. The cylinders are separately cast and the valves are opposite and mechanically operated. The construction throughout gives the impression of unusual solidity and weight, an exception being, perhaps, to be made in the case of the gears in the gearcase, which are narrower than might have been expected for the power they transmit. The clutch is of the regular conical type, but the movement of the pedal is transmitted to it in a very indirect fashion.

The engine is lubricated entirely by splash from the crankcase and a large oil tank is set near the footboard just inside the frame, from which the oil is delivered by a plunger pump worked by the foot. In the gearcase the jackshaft is below the driving shaft. The transmission is direct on the fourth speed and the gears are not selective. On each side of the differential the case is extended by bolted-on sections, one of which straddles the differential brake, and these extensions are supported on brackets under the side-frame members. A ratchet sprag is attached to the differential inside the gearcase and is operated by a small foot lever, which normally is forward of the pedals and out of the way and puts the sprag in action by being drawn back. The front end of the gear box has a swivel supported in a cross member of the frame. The rear sprocket wheels and brake drums are very large and the brakes are enclosed and supported from heavy radius rods of oval section. The rear springs are of the platform type.

English Daimler Co.—The English Daimler cars are represented by a chassis, an open tonneau and a limousine, all of the 28 horsepower model. These cars have armored wood frames mechanically operated valves, worked from a single camshaft on the left-hand side of the engine, Simms-Bosch high-tension ignition, and also battery ignition with a single coil and secondary distributor, and a transmission gear giving four speeds and reverse. The engine shaft is in line with the lower shaft in the gearcase and the upper shaft transmits the power to the differential, which is at the front end of the gearcase, instead of the rear end, as usual. All the gear shafts run in ball bearings. The foot brakes act directly on the sprocket pinions instead of on the differential, as usual.

American Peugeot Automobile Co.—The Peugeot exhibit comprises a beautiful polished chassis, an 18-24-horsepower open tonneau car and a 30-40-horsepower tonneau with Cape cart hood. The Peugeot for 1906 has a considerable number of improvements not found in the 1905 cars. The gearcase and differential case are separated by a considerable distance and are connected by a shaft having slightly loose couplings at each end. The gears give four speeds ahead and operate on the selective system with direct drive on the fourth. The gear and pinion in permanent mesh are located at the front end of the gear case, this arrangement corresponding with American practice. It has the advantage that on the direct drive the jackshaft is turning slower instead of faster than the shaft carrying the sliding gears. At the back of the gearcase is a powerful double-acting expanding brake and another brake of similar action is on the differential. The former brake is operated by a pedal under the left foot, and is not connected with the clutch, which is released by another pedal. Contrary to usual practice, the differential brake is operated by the side lever and the brakes on the rear wheels are engaged by a pedal under the right foot. All the brake shoes are cast iron, and all the brakes are enclosed. Unlike most 1906 cars, the Peugeot is unprovided with torsion rods to take the strain of the rear brakes.

Truffault suspensions are a regular equipment of the car and are attached by brackets which are pivoted to allow for lateral play as well as vertical.

The radiator is of the square tube honeycomb type, and from the bottom of the radiator to the back end of the gearcase extends a sheet-brass pan, or apron, which is in sections attached separately to the bottom of the frame by spring clips, so as to be instantly removable. Flannel strips are laid between adjacent sections of the pan and between the pan and the frame to deaden all sound.

Ignition is by Simms-Bosch low-tension magneto with supplementary jump-spark ignition by battery. The carbureter is entirely new; the spray nozzle is a minute horizontal slit in a vertical stand pipe closed at its upper end. A tube works over this stand pipe and has a V-shaped notch which partially covers the ends of the slot from which the gasoline jet issues. This tube, or shutter, is connected to the throttle, which is of the balanced piston type. The entire air stream entering the carbureter passes through an automatic valve connected to a piston in an air dashpot. This valve has holes in it through which the minimum supply of air can pass for the slowest speed of the motor. The motor is lubricated entirely by splash, the oil being fed to the crankcase by a large plunger pump operated by the driver at discretion.

The clutch is self-contained and draws backward to release. The releasing fork worked by the clutch pedal carries a pair of rollers running on small ball bearings, and these take the place of the usual ball-thrust collar. D. W. F. ball bearings are used throughout the transmission.

Lansden Co.—This company shows an electric delivery wagon with Edison battery, and also a decidedly novel-looking electric runabout, styled by them the "Electrette." It has a 90-inch wheelbase and carries an Edison battery under a very long and wide and low bonnet in front of the dash. The company guarantees a speed of 25 miles an hour and 50 to 60 miles per charge.

Palmer & Christie.—This exhibit comprises a polished Martini chassis of 20 horsepower, a 20-horsepower landaulet with body by Thrupp & Maberly, of London, and a 40-horsepower tonneau car with Cape cart hood, the body by More & Munger, New York.

The Martini car is not greatly changed from last year, except in the clutch, which is now of the ordinary conical type, not metal-to-metal, as before. The main driving shaft has a slightly loose square coupling just back of the clutch and a universal joint of unusual size just forward of the gearbox. The transmission gives four speeds forward on the selective system, without direct drive on the high. The gearbox is supported at both ends on cross members of the frame, thus rendering the differential brake and related parts as accessible as possible. One of the differential shafts has a positive lock, which can be shifted to engage the differential shaft in case of breakage of the differential teeth. Exhaust pressure is used to raise the gasoline from the tank at the rear to the carbureter, and the same pressure supplies water from a small tank on the frame to the differential brake, which is cast with internal ribs to hold water for cooling purposes. From this tank the water goes to a valve on the dashboard and discharges downward into a small funnel from which it flows by gravity to the brake drum. In this way the operator can see that the water is being supplied.

The rear sprockets are capable of being used as a ratchet sprag, pawls for this purpose being pivoted on the pressed steel combination torsion and radius rods which support the rear brakes and adjust the chain tension.

Aster Co.—At this stand is shown a handsome combination tonneau and limousine car of 30-35 horsepower made up with the exception of the body from parts imported by this firm. The motor is a four-cylinder Aster motor and the running gear, transmission, frame, etc., are supplied by Malicet & Blin, for whom also the American concern has the agency. The tires, lamps, horns and small sundries are supplied by the Société Industrielle des Telephones. The body is a regular side-entrance tonneau with a removable limousine top, the door of which is secured to the tonneau door so as to swing with it as a single piece.

At the same stand is a light racing car built by Breese & Lawrence to demonstrate the qualities of their new aluminum alloy known as aluminoid. It has a two-cylinder Aster motor rated at 12 horsepower, a very light and compact three-speed transmission, propeller shaft drive, and side springs similar to those used on the Knox and other cars, but having their front and rear portions spaced further apart, owing to the length of the wheelbase. The makers state that their aluminoid is suited for any purpose for which aluminum castings can be used, and that they have never found it to test less than 25,000 pounds per square inch ultimate strength. The elastic limit is close to the ordinate strength. The car shown weighs about 1,000 pounds, but they consider that it could be lightened without detriment.

Central Park Auto Storage Co.—At this stand is shown a Spyker car, lately received. It is of 20 horsepower with four-cylinder motor, armored wood frame, battery ignition, three-speed sliding gear and propeller shaft drive. The rear springs are of the platform type.

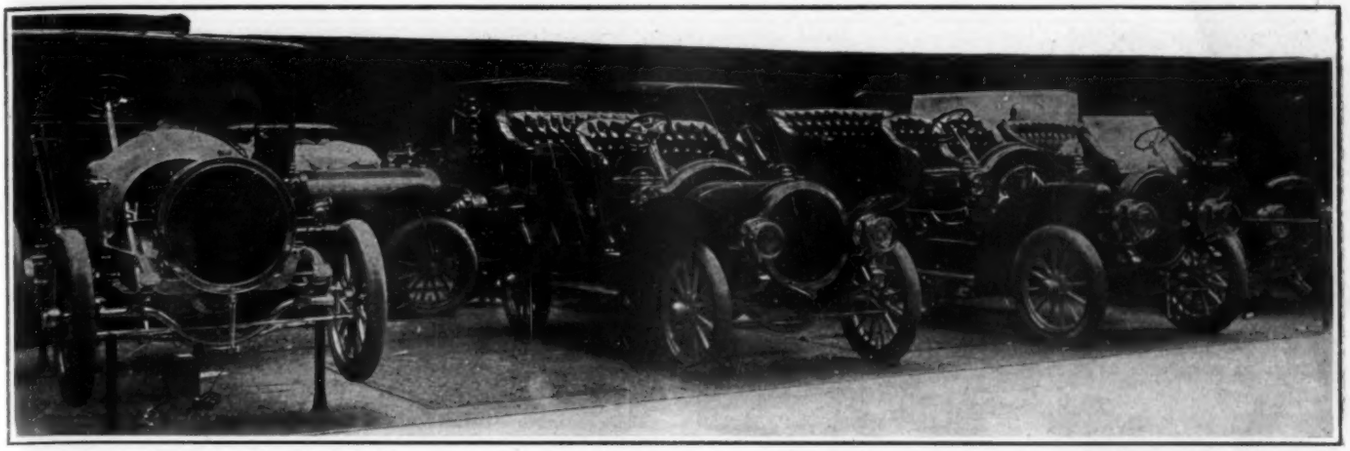
American Locomotive Automobile Co.—This company shows a handsome polished chassis of the Berliet car, for which they have taken the American rights and which they expect shortly to build in Providence. Besides the chassis is shown an open tonneau with body by Lamplugh, and a landaulet by Kellner. In general this car follows the lines of high-class French construction. The motor has cylinders cast in pairs, with valves on opposite sides. No sub-frame is used. The flywheels have fan-blade spokes, and the clutch is of small diameter with metal-to-metal surfaces and is entirely enclosed. The sliding gear transmission operates on the selective system and gives four speeds, all indirect, and reverse. The gearshafts and transmission generally run in ball bearings. Each differential shaft has its own brake drum and the brakes are operated simultaneously by a pedal. Side chains complete the transmission. The radius rods are drop forged in I-beam section and support the rear hub brakes.

Cryder & Co.—This firm exhibits two 40-horsepower Leon Bollee cars, one of them a King of Belgium tonneau with body by Rothschild and a folding Victoria top over the tonneau seat; the other a tonneau with a body molded on straight lines and provided also with the Victoria top. Both bodies are aluminum. In addition is shown a striped but not polished chassis. From this chassis it is seen that the Bollee car for this year is substantially the same as last year. The cylinders are cast in pairs with opposite valves, both mechanically operated. Ignition is by Simms-Bosch high-tension magneto, and also by battery and coil, two sets of spark plugs being provided, one over the inlet valves and the other screwing into the sides of the inlet valve chambers. The battery set is used for starting and as an emergency, and the magneto for regular running, and especially for high speed. The gearbox is suspended at its front end from the cross members of the frame and at the rear end by tubular extensions over the differential shafts. These devices are supported in brackets under the side members of the frame. The change-speed gear gives four forward speeds arranged on the selective system. As the gearbox is quite a distance back of the rockshaft connected with the operating levers the latter acts on the selective or pick-up device in an aluminum housing independent of the gearbox, but is connected to it by a sort of square sheet-metal tube, in which the three sliding rods operate which are connected to the gear.

The engine, as before, has the characteristic Bollee three-point suspension, the front end of the crankcase being carried by the front cross member of the frame and the rear end having two integral laterally extending arms which rest on the side members of the frame.

The control in general is conventional, but it includes an attachment on the clutch operating mechanism which partly closes the throttle when the clutch is released, thus acting independently of the governor to prevent the engine from racing.

Napier Motor Car Co. of America.—This company did not have its exhibit complete. It showed a six-cylinder motor of the new 1906 type which has already been described in these columns. It has inlet valves over the exhaust valves, opened by rocker arms and vertical push rods, and the cylinders are cast in pairs.



NATIONAL TOURING AUTOMOBILES WITH CHARACTERISTIC CIRCULAR FRONT RADIATOR, ON VIEW IN ARMORY SHOW.

A 24-horsepower 1905 model Napier was on exhibition; and also the new "Nike" Napier runabout of 18-20-horsepower. This runabout has a four-cylinder water-cooled engine under a front hood and has three-speed sliding gear transmission, with direct drive on the high gear and a metal-to-metal clutch. It is quite light, being stated to weigh but 1,500 pounds, and should be a very able and lively car.

Norris N. Mason showed a limousine in wood by Kellner, painted maroon, with vertical stripes, and a landaulet by Locke & Co., New York. Both cars have folding vis-à-vis seats and are of 40-horsepower size.

Dayton Motor Car Co.—A well located exhibit of three models on the floor and several demonstrating cars attract much attention. The Model D touring car has a body finished in pearl gray, and its motive power is a 30-35-horsepower vertical engine. This same model is also shown with Victoria top and also with limousine body. A polished chassis shows the working parts, as does also a model of the transmission gear and a model of the direct drive separately staged. The torsion tube which encases the pinion driving shaft relieves the driving strains on the rear axle. This tube extends forward to a ball and socket sliding joint firmly attached to the cross member of the frame. The model of the change-speed gear shows the shift lever operating in an H slot to control the selective type of transmission. Traveling in the left slot produces the low and reverse; the right slot the high and intermediate. Neutral position is obtained by placing the lever in the center of the guide.

Jackson Automobile Co.—What first attracts attention at the Jackson stand is the latest production of the Jackson factory, a 40-45-horsepower touring car with four-cylinder vertical motor. It is designated Model G and is equipped with cape top and wind shield. A multiple disk clutch, permitting the car to be started on high gear with full load, is one of the car's strong features. Two other models are shown, Model C, equipped with two-cylinder 20-24-horsepower horizontal motor under the body of the car, with chain drive, and Model D, of the same horsepower, with motor disposed crosswise under the hood with shaft drive. The later is equitpped with cape top.

Cleveland Motor Car Co.—The exhibit of this manufacturing concern is advantageously located to the right of the main entrance of the Armory, on Lexington avenue. The cream of the exhibit is Model F, a 30-35-horsepower touring car, which is a new car for 1906, though many of the successful features of last year's 20-horsepower model are retained. It has a four-cylinder vertical engine placed forward, transmission of sliding gear type, and low tension magneto with make-and-break spark in place of jump spark, as used last year. A feature of the ignition system is that the timing is regulated by the speed of the magneto, which is geared to the motor by a half-time shaft, with timing gears enclosed in aluminum casings. A beautiful Victoria body in red surmounts the running gear. Two other cars of the same power and mechanism are shown, one with double phaeton tulip body, the other with limousine body, and in addition to this a polished chassis and a number of the separate working parts are displayed. The finish of all the models is excellent. A model of the 20-24-horsepower touring car, practically the same in construction as that of last season, completes the display.

Mitchell Motor Car Co.—The exhibit of five models of Mitchell cars seems to bear

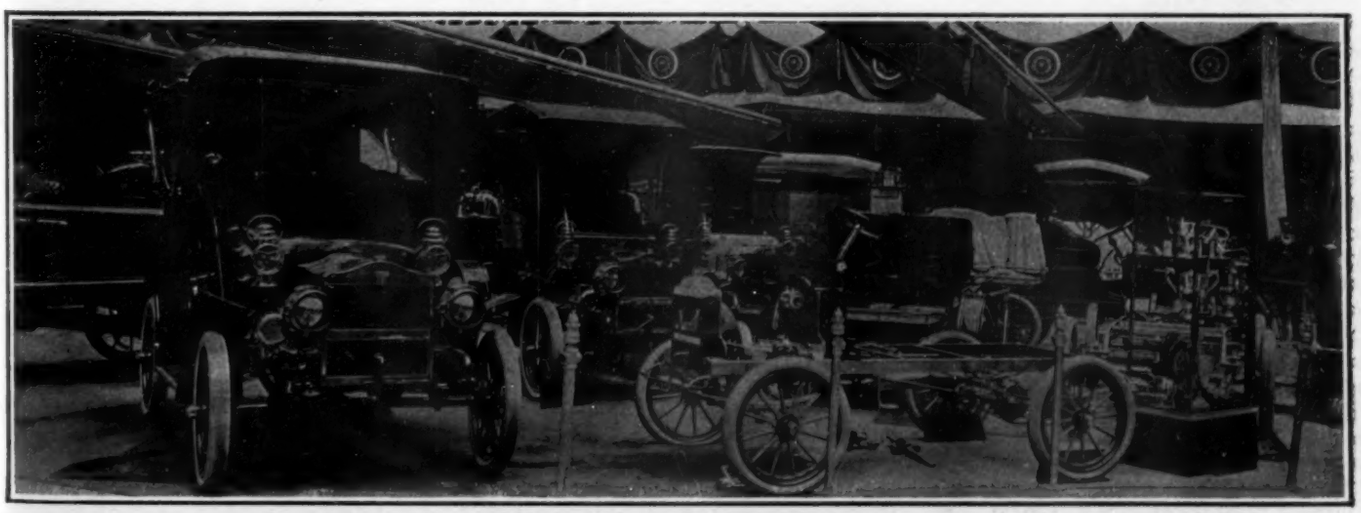
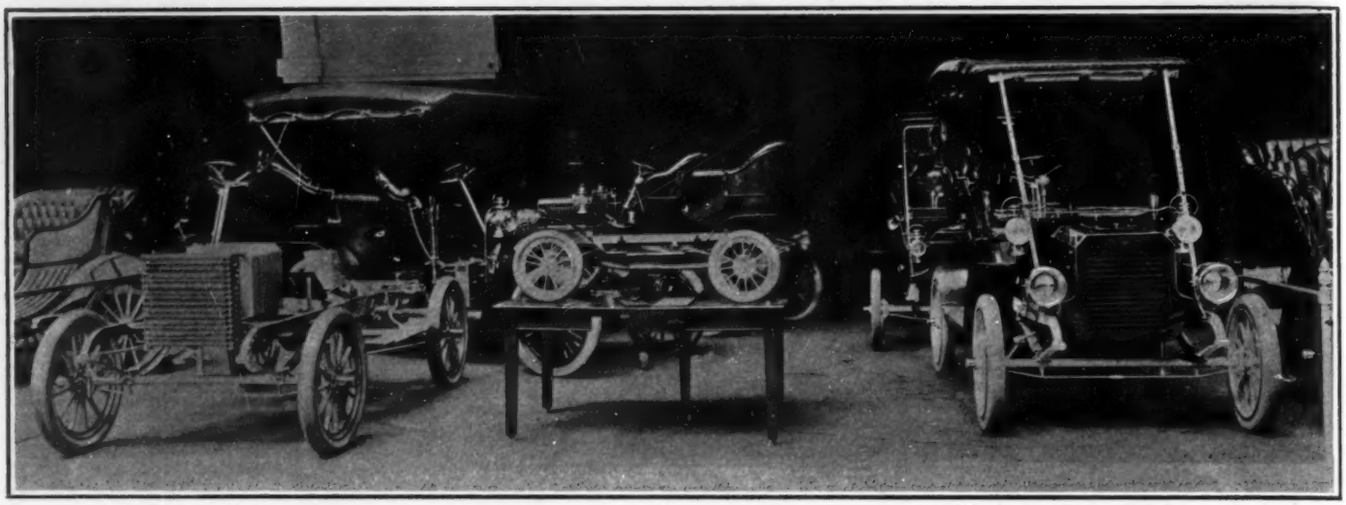


EXHIBIT IN ARMORY SHOW OF MAXWELL MODELS AND TROPHIES WON BY THIS CAR IN VARIOUS CONTESTS.



REO FINISHED MODELS AND CHASSIS IN ARMORY SHOW—MINIATURE CAR ON TABLE IN CENTER OF PICTURE.

out the claim that the company has used every legitimate effort to secure good material, workmanship and design. The Model 2 runabout, with 8-10-horsepower two-cylinder vertical motor under the bonnet, has a prominent location and is flanked by Model B4 touring car with 18-20-horsepower, four-cylinder vertical motor with mechanical oiler, and Model D4 touring car, with 28-30-horsepower engine. A new four-cylinder runabout with 16-18-horsepower vertical motor, has been added to the line for 1906 and is shown in the center of the stand. This car has been built to meet the growing demand for a runabout possessing speed and power, and it is asserted that it will meet every requirement. A 14-horsepower vertical two-cylinder truck is also shown, and the street demonstrating contingent includes Model C, Model D4, and the truck.

Marion Motor Car Co.—Model 5, a 28-horsepower vertical air-cooled engine touring car, is shown, together with a chassis of the same. The machine differs from last season's model in having its cylinders placed lengthwise instead of crosswise, and has pull rods on the exhaust valves instead of a rocking lever. Two street demonstrating cars of the same model do duty outside the Armory.

Bartholomew Co.—A distinctive type of transmission gear of the planetary variety is a feature of the 36-horsepower Glide Model E, which is shown in two styles of finish by this company. One of the cars is in auto gray and the other in the popular Brewster green, and both models are equipped with cape tops. The transmission gear is contained in an oil-tight case and runs in oil. No clutch adjustments are required, but means of adjustment are provided and are effective without removing the case cover and without the use of a wrench. The makers lay practical stress upon the ease of operation and the freedom from shocks. The motor is of four-cylinder vertical type with bevel gear drive. Model F, the 18-horsepower Glide touring car, is also shown, as is Model C, a 10-horsepower Glideabout. A separate model of the change-speed gear shows its operation. Model E does outside demonstrating duty.

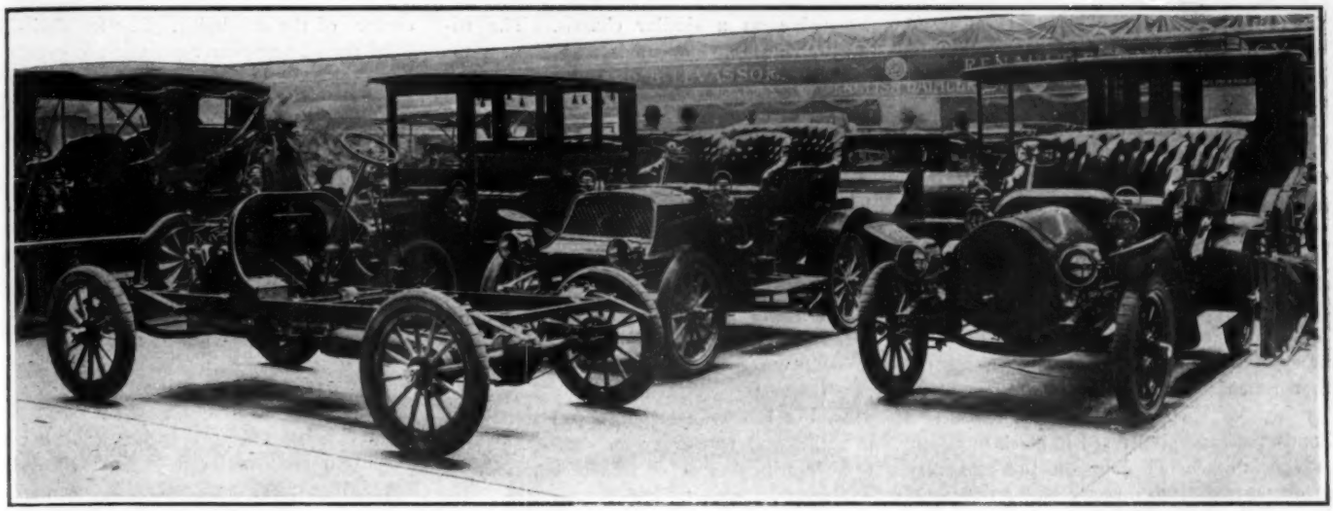
Ardsley Motor Car Co.—This year's changes in the Ardsley include a new special carbureter and new muffler, the adoption of a straight jump spark, sight pressure feed lubrication, and a change in the water cooling system from centrifugal to positive gear-driven pump. The modifications are all embodied in the 40-horsepower model shown, and exemplified in detail in the chassis which is also a part of the exhibit. The body of the car is finished in an attractive shade of light green and is surmounted with cape top.

Austin Automobile Co.—That Grand Rapids, the home of the great furniture industry, can also produce something attractive in automobiles, is at once apparent when the three models in this exhibit are seen. All of the Austins are equipped with 60-horsepower four-cylinder vertical motors. The workmanship is of a high class, natural finish mahogany predominating in the woodwork of the bodies. The touring car is finished in white with brown trimmings, and the buff upholstering lends a pleasing effect, the cape top being in harmonious color. The limousine body is in mahogany and will carry seven persons, including chauffeur. The upholstering is in brown leather, and the finish of the body is a black trimming with gold stripe. One runabout with a special folding rear seat is shown. The running boards on all the Austins are faced in mahogany in the natural wood.

Buckeye Manufacturing Co.—The Lambert exhibit is the home of the friction disk drive, and four models on the floor and five demonstrating outside, two of which are platform trucks, testify to the practicability of friction drive as adapted to the Lambert car. This transmission is a fibre-faced wheel in contact at right angles with an aluminum-faced engine flywheel. The driven wheel slides on a feathered countershaft which has a differential and drives by side chains. Models 7 and 8 are touring cars of 34 horsepower each, with four-cylinder vertical motors and three-point suspension. Models 4, 5 and 6 have opposed cylinders, the former two having detachable tonneaus. Model A is the runabout. The trucks shown are of 2,000 and 1,500 pounds capacity respectively. A chassis with bonnet shows the friction disk drive in operation.

Welch Motor Car Co.—The special features of the Welch car are the valves opening directly into the cylinder heads and operated by a cam shaft on top of the engine, and the peculiar gear and clutch arrangement in the transmission case. The clutches are of the multiple disk type and are two in number. They are supplemented by a pair of positive clutches, the arrangement being such that one clutch is used for the direct drive, and the other disk clutch in connection with one or the other of the two positive clutches for the low speed (there are only two) and reverse. The gear shafts run in plain bearings, and are oiled by very large bronze rings which dip into the oil in the lower half of the gear case. One bearing which cannot be oiled in this manner is oiled by a copper tube coiled in a large spiral and soldered on a disk which revolves with the shaft, the outer end of the tube dips in the oil and on revolving it carries it to the bearing.

The makers state that their countershaft is of nickel steel imported from Germany, and that their axles are of American nickel steel, dropforged in one piece. The radiator is a decided novelty in that the circulation pump is integral and the radiator is so arranged that the water must pass through it in traveling from the top to the bottom of the radiator. The pump is operated by the same shaft which drives the fan, and is of the centrifugal type. The engine is lubricated by the Hill precision oiler. There are no sight feeds on the dash, but a row of them on top of the oiler under the bonnet. Four of these feeds to the pistons, two more to the crankcase, and two to the gear-



PREMIER AIR-COOLED CHASSIS AND TOURING CARS WITH OPEN AND CLOSED BODIES, ON EXHIBITION IN ARMORY.

case bearings. The cardan joint at the forward end of the propeller shaft is so arranged that it can very readily be disconnected in case it is necessary to take out the shaft.

White Sewing Machine Co.—This exhibit comprises a two-passenger car, or touring runabout, a tonneau with Victoria top, a tonneau with Cape cart hood, a landaulet, a tonneau with canopy top, and provided with the usual swinging glass front and another swinging glass which can be let down to meet the back of the front seat. A limousine is also shown.

The principal new features of the White car for this year are as follows: The draught from the top of the generator is carried downward and under the body, and for this purpose the bottom of the burner is made air tight and all the air entering the burner goes through the double mixing tube. In order to give the fuel jet sufficient velocity to force the air through when the car is standing the gas pressure has been considerably increased. The mixing tube is also considerably larger. The crankshaft has been made heavier and the ball recesses are now made of one piece instead of two, as before. The propeller shaft and both axles are heavier and the rear brakes have been enlarged and are enclosed.

C. H. Blomstrom Motor Co.—At this stand two of the new Model K "Queen" cars, one with Cape cart hood; also a Model E with hood, this car being the same as the 1905 "Queen." No separate chassis were shown.

The new Model F "Queen" car has a four-cylinder vertical motor in front and is rated at 28-30 horsepower. The valves are mechanically operated and are all on the left side of the engine. The lubrication is positive, the oil being conveyed by independent tubes to the cylinders and crankcase. Two pipes also lead to the gearcase, the shafts in which run in plain bearings. The transmision is by three-speed sliding gears with direct drive on the third. A propeller shaft running in a large tube rigidly connected to the rear axle completes the transmission. The bevel pinion shaft and the live shafts in the axle run in Hyatt roller bearings. The rear axle is provided with a torsion rod to relieve the springs of the torsional effect when the brakes are applied. Both the side-brake lever and the foot brake act directly on the rear wheels, the foot brake acting on the outside and the emergency brakes inside of drums bolted to the wheels.

Acme Motor Car Co.—Type XIV, Acme light touring car, in olive green, and a chassis of the same type, with limousine body, are shown. The power equipment is a 30-35-horsepower, vertical four-cylinder engine. An Acme landaulet, known as Type XV, has 45-50-horsepower. The body shown on this car is in natural mahogany and wine color with black trimmings. The 1906 changes in the motor show mechanically operated valves on opposite sides of the cylinders. There are ten disks in the multiple disk clutch used on the Acme cars. Each of the above models is also represented among the demonstrating cars outside the building, and a 16-horsepower delivery wagon is also shown. This delivery wagon and the limousine are separately located from the main exhibit, in a room in the northeast corner of the building immediately adjacent to the offices of the Armory show management.

Moon Motor Car Co.—This St. Louis concern, a newcomer in the field, displays one touring car and a chassis. The prime mover is a four-cylinder vertical 30-35-horsepower engine, which drives through sliding gears and propeller shaft. The body has a light derby red finish and is fitted with a cape top.

Moline Automobile Co.—Three cars are shown at this exhibit, one a Model C touring car, and another a Model C chassis, with limousine body. A duplicate of the touring car does demonstrating duty outside. Four-cylinder, vertical motors are used in these models, while Model G, the third type shown, has a double-opposed motor. Model G has detachable tonneau.

Nordyke & Marmon Co.—A chassis at the front of this exhibit is rigged so as to show the operation of the double three-point suspension, which is the leading feature of the Marmon car. The display is a novel one and attracts much attention. Two touring cars are shown, Models C and D, the former having a 24-horsepower air-cooled motor, and the latter 30-horsepower air-cooled engine. The motors are set in the frames in pairs at 90 degrees angle to each other. The double three-point suspension is designed to give a flexible running gear, permitting the use of straight-shaft drive without cardan joints or universal couplings of any kind. The system of lubrication for the crankshaft is by pump force feed under uniform pressure through drilled shaft, which system is also carried out in the connecting rods by a conducting pipe to the wrist pins in the piston heads. A set of aluminum castings in the rough shows the observer the material that goes into the bodies. These castings are bolted where jointed together. Four street demonstrating cars, two of each model, do service outside the building.

St. Louis Motor Car Co.—This long-established firm is represented on the main floor by two machines, one being Model 16, with four-cylinder vertical 32-36-horsepower motor, cream running gear and body in dark blue, and the other, Model 15, with Victoria body of light brown finish and motive equipment of a 30-34 horsepower engine.

Knox Motor Truck Co.—An Atlas gasoline truck is shown at this stand, bearing the name of a representative New York mercantile concern to which it has just been sold. An important feature of the Atlas truck is the direct spur gear drive to the rear axle. This construction has the effect of allowing the crankshaft, valve gearing, all the transmission and compensating gearing, the driving axle and all bearings for these parts to be enclosed together in one casing, and oiled from one oiler with mechanical feed, a substantial and compact arrangement.

Ford Motor Co.—The much heralded four-cylinder runabout, which will sell at $500 (the price has been settled finally), is

the center of attraction at the Ford stand, which has one of the largest and best located exhibits in the building. The newcomer is certainly a "good looker," and as it weighs but 700 pounds it will appeal to those who desire light weight in conjunction with ample power. The cylinders, four in number and vertical, are 3 5-8 inches bore by 3 1-4 inches stroke, and develop 15 horsepower, insuring a speed ranging from three to forty miles an hour. The Ford company announces that it is making parts for 10,000 of these runabouts. Another new product of the factory shown for the first time is a six-cylinder 40-horsepower touring car with 114-inch wheelbase, a handsome car upholstered in black morocco. A special steering gear on the planetary principle is located directly under the steering wheel, and a reduction gear reduces the possibility for the wheel to twist out of the driver's hands. A polished chassis of the six-cylinder car is also shown, finished in black enamel and hand scraped on the cylinders and cases, as perfect a bit of metal finishing as can be found in the show. A number of other Ford cars complete the exhibit together with several outside demonstration cars.

Corbin Motor Vehicle Corporation.—In the center of the exhibit is shown a polished chassis of the Corbin air-cooled car, a plate glass mirror on the floor directly under reflecting the under side. The special air-cooling system which is the distinguishing feature of the Corbin product is exemplified in detail, working parts and sectioned models being arranged on a convenient table. The system of ball bearings, which extends to practically all the working parts is also shown by means of special models, as is a model of the Corbin universal coupling. On each side of the central portion of the exhibit are located the 1906 cars, Models E and G. The whole display is advantageously located at the west end of the hall adjacent to the Twenty-sixth street entrance. The Corbin people dwell particularly on accessibility to the working parts of their motors and state positively that the motor can be entirely dismantled even to crankshaft and flywheel without disturbing the front or dash. All the nice points are attractively set forth in a new finely printed catalogue replete with illustrations.

Reo Motor Car Co.—The first thing that attracts the observer in the Reo exhibit is a miniature car in operation, an exact replica of the Model A Reo. This little car weighs but 238 pounds, but is equipped in every detail like the full size cars. A 2-horsepower double-opposed motor supplies the power. This is said to be the first complete working miniature model of a gasoline motor ever built in this country and it is a decided attraction. This year's addition to the Reo line, a 24-30 four-cylinder vertical engine touring car, is shown with cape cart top, as is also a well finished limousine on a similar chassis. The 16-horsepower touring car is also shown, together with a chassis of the same. The exhibit is completed with a single-cylinder 8-horsepower phaeton fitted with folding rear seat and glass front. Two street demonstrating cars are in use outside the building.

E. B. Gallaher.—A beautiful 24-36-horsepower polished chassis of the Brasier car is shown by E. B. Gallaher. In the same stand are a fine "King of the Belgians" aluminum body and a 24-36-horsepower tonneau car in red. The Brasier car does not show any marked changes from last year, but has been strengthened somewhat in axles and transmission, shafts, etc. It was described in detail in a recent issue of THE AUTOMOBILE.

The 24-36-horsepower car is driven by side chains, but the smaller car, rated at 15-25 horsepower, has a propeller shaft drive. A feature of these cars which might well be imitated on others is the provision of small covered oil cups on all such bearings as are usually furnished with oil holes only, such as those of the spring shackles, the joints of the control and brake levers. The cups are very minute, hardly more than 5-16 inch in diameter, but each cup has a cover that closes with a snap and keeps out the dust.

Besides the Brasier cars two 30-35-horsepower Cleveland cars, Model F, are exhibited by Mr. Gallaher. One of these is an open tonneau and the other a limousine. These cars embody a number of interesting and up-to-date features. The cylinders are cast in pairs with opposite valves. The 2 to 1 gears are at the front end of the crankcase and they drive a Simms-Bosch high-tension magneto on one side and the centrifugal circulation pump on the other by direct pinions, the former running at the same speed as the engine. The crankpins are oiled by centrifugal feed, the oil being delivered to internal rings on the cranks from which it is led to drilled holes to the centers of the crankpins. The transmission is of the sliding gear type, and the gearbox, like the motor, is supported on a false frame in the same horizontal plane as the main frame.

The Cleveland rear axle has a "torsion rod" or large steel tube clamped into the casing which surrounds the bevel gears and differential and the front end of this rod is supported by a cross member of the frame. Its object is to relieve the springs of the duty of resisting the torsional effect of the brakes when they are applied. The Cleveland, like the Brasier, has its exhaust muffler outlets directed toward the base of the rear wheels so as to blow the dust away from the latter before it has a chance to get lifted and scattered by suction of the car.

Charron, Girardot & Voigt.—At this stand is a 20-horsepower chassis arranged for a brougham body, the steering column being at the extreme front of the machine and the driver's seat being over the engine. A 75-horsepower polished chassis is also shown, but in a slightly incomplete state, the oil pipes and some other small parts not being in place.

The complete cars are as follows: A 20-horsepower tonneau by Rothschild, color, red, with Victoria top. A 20-horsepower demi-limousine, which is substantially an open canopy tonneau, with the canopy top a permanent fixture, and the rear seat partly closed in. This car seats four in the tonneau, there being two folding vis-a-vis seats. The body is by Mühlbacher and is painted red in two shades of vertical stripes.

A 20-horsepower landaulet with dark blue body by Demorest, of New York, has two folding vis-a-vis seats inside, and another body by Demorest, a limousine, has two seats arranged to bolt against the sides of the body. This body is painted maroon, while the landaulet is dark blue.

The "C. G. V." shows few changes from last year, but the very large foot brakes on the differential deserve special notice. The

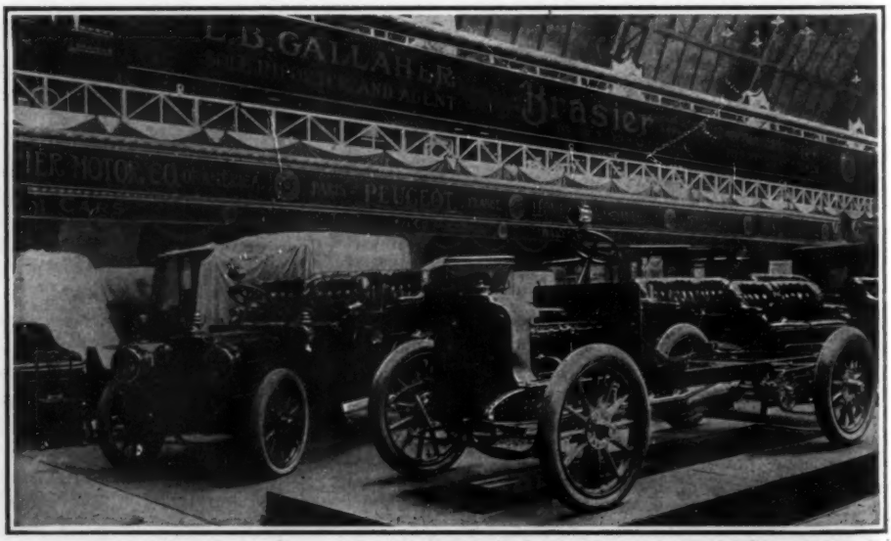


EXHIBIT OF THE BRASIER CARS IN ARMORY SHOW—CHASSIS IN FOREGROUND.

FOREIGN CARS SHOWN BY DECAUVILLE AUTOMOBILE COMPANY IN THE GARDEN.

gearcase is extended at the sides, bolted on housings which extend to and are supported by brackets under the side members of the frame, and one of these housings straddles the brake and is slotted out to permit inspection and adjustment of the latter. The brake shoes are of cast iron and act by expansion inside of the brake drum. The flywheel is made with fan blade spokes and the aluminum clutch, which is of the ordinary type, has fan blades likewise, which assist the draft when the engine is at work. The radiator is the cloissoné, Grouvelle & Arquembourg, and is located very low down in front of the frame and between the spring horns. A sheet-iron pan extends from the bottom of the radiator to the bottom of the flywheel and the air drawn by the flywheel passes under rather than over the engine. The Simms-Bosch high-tension magneto is used with a battery and coil for starting, the car in this respect being the same as last year.

The 75-horsepower chassis presents a somewhat striking appearance from the form of the engine cylinders. These are cast separately, with the water jackets square in horizontal section, but are left open at front and back in the casting and are closed by flat brass plates which almost touch each other when the engine is assembled. In this car also the differential brake is of unusual size, and it is enclosed within a housing in the same manner as that previously described. In this chassis the transmission in the gear box is indirect on all speeds and the gears operate on the selective system. In the smaller car the drive is direct on the high speed and the sliding gears are all connected and operated from first to fourth by the continuous movement of the lever. The frame of the large car is something of a puzzle. The standard C. G. V. frame for some years past has been a square steel tube tightly filled with a wood core, but the section of the frame on the large car is rectangular with the long dimension vertical. Apparently the frame is a steel tube like the other and filled with wood, but precise information on this point could not be obtained.

A decidedly unusual feature is the carbureter, which is of the float feed type, but which has two hollow independent spray jets and mixing chambers, each with a small dilution orifice over it. It was stated by an attendant that when the car is running slowly, only the smaller jet is in action, but as the speed increases some automatic device, not visible from the exterior, opened a passage from the larger jet. The principle would seem to be correct, but the carbureter was certainly of extraordinary size.

Duryea Power Co.—Two of the ten different styles of cars built by this company are shown in the exhibit as representative types. One of these is the double victoria, 25-30-horsepower, with body finished in green and designed with the curved lines that are a Duryea characteristic. The other model shown is a folding rear seat phaeton. A historic relic, a Duryea carriage of the vintage of 1892, is also shown. The Duryea single-control lever, which controls all the operations of the car with the exception of applying the brake and reversing, is a feature of all the cars. All the Duryea motors are of the three-cylinder type, and they stand alone as an exponent of this particular variety of construction at the Armory show.

Rainier Company.—The exhibit of this well-known metropolitan concern is located near the Twenty-sixth street entrance of the Armory, facing the main aisle, and having as a background the west wall. The display is an extensive one and consists of a splendidly polished chassis, of 30-35-horsepower, which is the leader of the Rainier line. A similar chassis is shown with open touring body and with limousine body, the appointments of which fully bear out the makers' claims of excellence and discriminating taste. The other models shown consist of two of the 22-28-horsepower machines, one a landaulet and the other a victoria.

Oscar Lear Automobile Co. — The Frayer-Miller is one of the attractions of the Armory show, its distinctive type of air-cooled motor being in a special individual class, and its record in the endurance contest at Long Branch last summer familiarizing it to residents of the Metropolitan district. The exhibit is located in Room 8, off the main hall, at the Lexington avenue end of the Armory, and consists of one of the new six-cylinder touring cars, a four-cylinder touring car, a four-cylinder limousine, finished in purple and black, and a polished chassis with four-cylinder engine. There are also four and six-cylinder cars used for demonstrating purposes. The feature of the Frayer-Miller is the system of cooling the cylinders, which are vertical and surrounded by aluminum casings. The cooling projections on the cylinders are cast on the sides and are small and short—about a quarter of an inch in depth. A blower driven by the engine forces a current of air from the front end of the hood through the casing or jacket around the cylinders. The mudguards shown on the cars are of a new concave shield type, graceful in outline.

Viqueot Co.—The Viqueot Company showed at the time of writing only a stripped chassis, which, however, displayed some interesting features. The motor has separate cylinders, and the crankpins are oiled by centrifugal rings and oil holes drilled through the cranks. The spark plugs are in the center of the cylinder heads. The front springs are of extraordinary length, being about 55 inches long, and have twelve leaves, while the rear springs are about 53 inches long and with eight leaves. It was claimed that this feature of the front springs improves the riding qualities of the car greatly.

The clutch spring is located in the gearcase and the entire shaft moves back and forth when the clutch is engaged or released, from which it would seem that the thrust is not self-contained when the clutch is engaged. The rear brakes are equalized by causing the wire cables which actuate them to run over a pulley on the end of the rod operated by the side lever and the rock shaft.

Wayne Automobile Company.—Many radical changes and a number of new additions to the line are shown in the exhibit of this company. Shaft drive has been applied to all the cars except Model C, which still retains the chain, and has the motor under the body. All the other models have the motor in the bonnet. Two high-power cars have been added—Models F and K. Both have four-cylinder motors of the vertical type, the former 50-horsepower and the latter 35-horsepower. Model F is shown in both the open touring car and with limousine body, the former finished in red throughout, and the latter in blue-black. Two other new cars are shown—Models G and H, both with 14-horsepower double-opposed motors forward, the former a light touring car and the latter a runabout. A decided change in body design is also noted. The tonneaus are fitted with victoria-shaped panels and turtle backs, and similar paneling is used in the limousine, where it is especially effective. Several demonstrating machines in the representative models, do duty outside the Armory.

Chadwick Motor Car Co.—This exhibit has a space on the first floor to the left of the main lobby, where a handsome limousine is shown. The engine is of 40-45-horsepower, four cylinders, each 5 by 6 inches, in pairs, with a single cylindrical copper jacket to each pair. Double ignition is fitted. The double chain drive is used. The sides are of glass, with glass front over driver's seat, completely enclosing the body but removable at will. A folding glass front is also fitted for the driver. The top carries a baggage rail. The car is finished in Brewster green and black.

McCrea Motor Truck Co.—The Champion electric trucks handled by this company are represented by a heavy express van of about 4,000 pounds capacity. Though assigned to the basement, its size has won it a prominent space on the main floor, to the left of the entrance. The general disposition of parts is conventional; battery slung under center of body and double chain drive to rear wheels.

Commercial Motor Car Co.—The three-ton truck shown by this company is too large for the basement stairway, and stands on the main floor just to the right of the outer doorway. The chassis and platform are very heavily built, with steel frame and massive steel forgings. The four-cylinder, 30-horsepower engine is in front, driving by jack-shaft and double chains. A large radiator is carried just in front of the dash. The Adams transmission gear is employed, the countershaft being splined to carry a sliding key of triangular section. Each of the spur gears is recessed in its bearing on the shaft, carrying a steel dog regulated by a spring. The sliding key is slotted at two points on opposite sides, one for the dogs of the two forward gears and the other for the reverse gear. The key is operated by gear from the driver's seat, and as it allows one or the other of the dogs to drop the corresponding gear is locked to the shaft. The car is equipped with segmented solid tires of rubber and hard fabric in alternate layers. Each segment is about one foot long and one inch thick; five of them side by side, breaking joints, make up the width of the tire, and about six in each layer make up the circumference. They are held in place by side flanges and through bolts, and any one may be removed and replaced by a new one.

Mors Automobile Co.—A landaulet in green and black striping, another landaulet in green with black striping; another landaulet in green, and a limousine in maroon. At the time of writing no mechanical particulars could be obtained.

Archer & Co.—This firm shows a beautiful polished Hotchkiss chassis with the motor cylinders inside of the channel frame members, the exhaust pipe and muffler, the fan and sundry other parts in gun finish, as a reminder to the spectator that the Hotchkiss car is made by one of the greatest gun-making concerns in the world. The chassis is of 35 horsepower and exhibits no marked changes from last year. The rear brakes are of the internal expanding type, but are not enclosed. The spring seats on the rear axle are very wide and are carried upward at their outer sides into brackets for supporting the brake shoes. The latter hang downward and are forced apart at their lower ends by an adjustable toggle, one arm of which is much shorter than the other. The short arm is fixed on the end of a rock shaft by which the toggle is actuated, and as the toggle arms straighten out this necessarily carries the end of the rock shaft slightly downward. To accommodate this, the shaft, instead of being carried in a parallel bearing, is supported in a ball and socket bearing adjacent to its inner end, from which rises a lever arm, by which the shaft is rocked by tension rod. The shaft is about eight inches long.

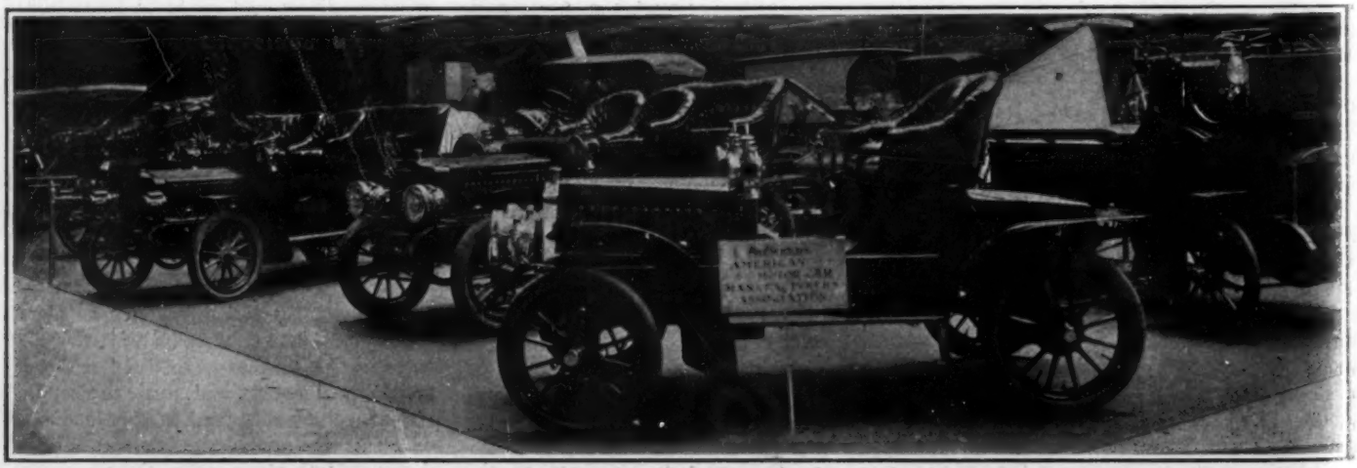
The rear end of the side frame is bent upward slightly and the spring horns are similar to those of the 1905 Mercedes. The rear springs are about 52 inches long and are of the usual width—about 2 1-2—and have eight leaves each. Besides the chassis a landaulet body is shown.

The 1905 Hotchkiss had a four-speed sliding gear much like that of the Brasier of this year, but the new car has selective gears and as before the drive is direct on the high gear.

Aerocar Co.—Model A, a four-cylinder 24-horsepower air-cooled touring car is shown, as is also a chassis of the same. The car is a newcomer to the public, and bids fair to take a prominent place in the trade, judging by the first productions. The plant of the factory is located at Detroit, where large and commodious new buildings have been erected and equipped with machinery for a large production.

Johnson Service Co.—Two beautifully finished limousine auto-carriages are shown in this exhibit. The Johnson Service Company is an old established Milwaukee house and has entered the automobile market with a 30-horsepower steamer, using kerosene for fuel. The power plant is located under a bonnet in front. The limousine bodies are elaborately designed and finished in the most approved manner. One carriage is finished in black and brewster green with cardinal red running gears, and the other is in pure white, upholstered in Alice blue. A crankshaft and camshaft are also shown separately.

Auto-Car Equipment Co.—The exhibit made by this company which has its factory at Buffalo, is of a fourteen-passenger electric hotel omnibus. The body is finished in Brewster green, and is lighted with bevel plate-glass windows that drop into pockets, three on each side and three front and rear. The interior is finished in natural white wood and upholstered in black leather. A rear door admits the passenger. The motor equipment consists of two Westinghouse vehicle motors aggregating 15-horsepower, driving by side chains to the rear wheels without gear reduction. Current is supplied by forty-four 13 M. V. Exide cells. The 'bus is electrically lighted from the battery. The manufacturers also show in street demonstration a three-ton truck, which it was found impossible to get into the building, owing to the size of the top, which is not removable. This large truck has 35 horsepower. The company also shows a



MITCHELL RUNABOUT AND TOURING CARS, IN THE MAIN HALL AT THE ARMORY AUTOMOBILE SHOW.

sixteen-passenger wagonette with the same power, operating on the street.

Iroquois Iron Works.—This company makes a specialty of commercial trucks and stages, and shows a four-seated sixteen-passenger motor stage in one of the corridors near the main entrance. This stage is 18 feet 6 inches long, 5 feet 6 inches wide, and is supplied with a 60-horsepower motor.

Lebanon Motor Works.—Mendel, Dale & Co., New York agents. The Upton car, now built by this company, is shown with some variations from last year's model. The 40-horsepower motor has four vertical cylinders, 4 7-8 by 5 inches, with central shaft drive. One car is shown, finished in light gray with black stripes—a very pretty combination.

Complete Cars in Armory Basement.

THE visitor who descends into the basement at the Armory Show will find one of the most interesting exhibits that of the Westinghouse Company, in charge of E. H. Heinrichs, of Pittsburg, Pa. The company exhibits for the first time in America the car built in the Havre, France, shops. The finished chassis contains a 30-horsepower four-cylinder motor. The chassis is of light steel and very rigid and is supported on long springs. The transmission gives four speeds and reverse all on one lever. A feature of the car is that it is fitted with three independent brakes—a hand brake operating on the rear wheels, a water-cooled foot brake operating on the differential gear and another water-cooled brake acting on the countershaft of the speed-changing gear. Any body desired may be fitted to the car. The company has established no American agencies as yet, but intends doing so and will eventually either manufacture the car in this country or send the parts over here and have them assembled.

In the same space J. P. Shea, of the Cooper-Hewitt Electric Company exhibits the well-known Cooper-Hewitt mercury vapor converters and lamps. The converter is used for the purpose of changing the alternating to the direct current for charging storage batteries. Another exhibit in this well-filled space is a special motor and air compressor with tanks for garage use. Air pressure to 100 pounds or more is stored in the tank and then piped to any part of a garage and used for inflating tires.

Oscar Werner.—The Werner Car Improvement Company exhibits the Werner seat suspension for limousine bodies and also for touring bodies. Oscar Werner, the inventor, demonstrated the workings of the new device by means of large drawings displayed on the walls. An old type Winton car on which the first suspension was used is shown and Mr. Werner demonstrated the improvements that have been made. As a result of the use of this device it is claimed that the chance of breaking springs is reduced to a minimum, and that a car is also fifty per cent. easier and more comfortable to ride in. A special air cushion device is used to take up sudden shocks and prevent spring breakage if the car drops into a hole suddenly. A 30-horsepower touring car is kept outside the Armory fitted with one of the new suspensions for demonstrating purposes.

Rapid Motor Vehicle Co.—At the booth of this enterprising company one complete vehicle is shown. It is a handsomely finished delivery wagon in white, with a carrying capacity of one ton. This is fitted with a double-cylinder opposed motor, planetary transmission, two speeds and reverse, wheel steer, side chain drive, solid side wire tires, full platform springs with supplementary spring in rear, transmission and hub brakes. The car follows the same lines that the company worked on last year, with no material changes. The engine is water-cooled. A handsomely finished paneled delivery wagon body is also shown. The company manufactures a 20-passenger sightseeing car, 1 1-2 ton stake truck and one ton delivery wagon. All types are to be found outside the armory for demonstration purposes.

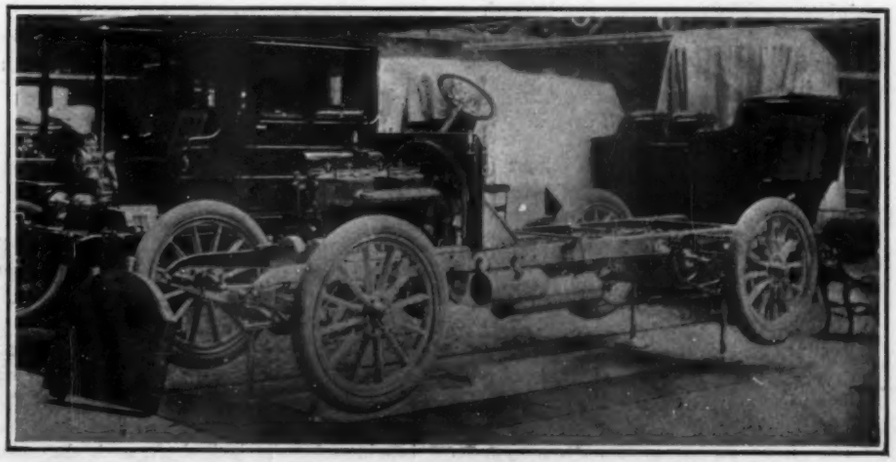
Logan Construction Co.—One of the most complete exhibits in the basement of the Armory is that of the Logan Construction Company, where all types of "That Car of Quality" are to be seen. An entirely new model—shown now for the first time—is attracting considerable attention. It is known as Model F and is a trim two-passenger runabout much on the familiar lines of the well-known Franklin type. The body is finished in tan with dark brown striping and is most attractive. The engine is a double-cylinder opposed 10-horsepower air-cooled. The cylinders are jacketed with copper fins; a four-blade fiber fan furnishes air for cooling. The transmission is sliding gear, two speeds and reverse with chain drive from a countershaft. There are two hub brakes of the contracting band type. The car weighs 900 pounds and has a speed of from 1 to 30 miles per hour. It sells for just a dollar a pound.

The well-known model G car of last year's type fitted with a handsomely finished body painted green is shown. Apart from a general refinement of lines this car does not differ from the 1905 type.

Model H is another new car and is shown fitted with a limousine body handsomely painted and upholstered. It is a five-passenger car of 100-inch wheelbase, fitted with a 30-horsepower water-cooled double-cylinder opposed motor under the body with chain drive direct from engine shaft. One transmission and two hub contracting band brakes are fitted. The transmission is sliding gear, two speeds forward and reverse. The speed is from 1 to 35 miles an hour. The double-cylinder opposed motor used in this car is shown mounted on a skeleton frame, as is the new 10-horsepower air-cooled motor used in the runabout.

A 30-horsepower 2-ton truck is shown fitted with the same engine and transmission as the Model H, but geared lower. This is, of course, fitted with solid tires.

Carey Motor Co.—The Carey Motor Company, a New York concern with a factory located on Girard avenue, in the Bronx, exhibits a demonstrating runabout which has seen several months of road use. This car is fitted with what was originally known as the Balser 5-cylinder revolving air-cooled motor. It is rated at 10-horsepower and has been manufactured since 1896, but has never been exploited before this time. The car has many original features and is a radical departure from anything now on the market. It has a two-speed and reverse transmission with individual clutches. When running the entire engine revolves at high speed and is so cooled. The cylinders are flanged, but no fan is used. The demonstrating car is



BEAUTIFULLY FINISHED CHASSIS OF AMERICAN MERCEDES CAR IN THE ARMORY SHOW.

used to prove that the motor cools positively, it being pointed out that the aluminum paint is not blackened or blistered by any heat from the cylinders. The car is to be manufactured in quantities this year.

Dorris Motor Car Co., of St. Louis, shows two completely equipped cars with latest side-entrance tonneau, cape top and lamps. The unusually wide doors of the tonneau are starred as a special feature. The exhaust is delivered directly under the rear of the body and high above the road to prevent its kicking up dust. The body has the usual dust lines. G. P. Dorris, the designer, will be in charge of the exhibit. Special attention is called to the valves, which are mechanically operated by a one-piece cam shaft and placed in the heads of the cylinders. They are interchangable. In the construction great care has been taken to protect the machinery from dust and dirt. A 22-inch fly wheel is used fitted with a fan. The engine has four cylinders, water-cooled. Slide gear transmission, three speeds and reverse with bevel gear drive. The car is warranted to run from 1 to 50 miles an hour. Particular attention is paid to elegance of body design, finish and upholstering.

Ariel Motor Car Co.—This company shows the four-cylinder water-cooled car complete with touring body and equipment and also the chassis of the same car handsomely polished and finished. "Look for the Oval Front," is its motto and the car is fitted with the distinctive front of this shape by which it can be instantly recognized on the street.

Special attention is called to the valves in the cylinder heads, they being mechanically operated and interchangeable. Bevel gear drive and slide gear transmission are used. C. R. Lewis, of Boston, the designer of the car, is in charge of the exhibit. The Ariel company anticipates a large year's business.

Detroit Auto Vehicle Co.—This exhibit includes the Crown 12-horsepower two-passenger runabout and the Crown 1,500-pound 16-horsepower delivery car. Special attention is called to the runabout by the exhibitors. The car is fitted with a four-cycle two-cylinder opposed motor set crosswise in front under a hood. The friction type of transmission is used, giving any and all speeds to the full capacity of the motor. On the high speed direct drive is obtained. One lever controls all speeds. The thermo syphon cooling system is used with vertical tube radiator. The motor is set in line with the rear axle and only one universal joint is required. Bevel gear drive is used. The delivery car is fitted with a 16-horsepower vertical motor under the seat, water-cooled. The car is chain-driven. The transmission is planetary. Any type of body desired is fitted.

The new 24-horsepower four-cylinder touring car is not shown, it being announced that the complete 1906 output has been disposed of. The factory is now working on a new model, which is to be put on the market on May 1 next. It will be fitted with a 40-horsepower four-cylinder engine. A new plant covering fifty acres is now in course of construction for the company at Romeo, Mich.

York Motor Car Co.—A. P. Broomell and A. J. Klein are in charge of this fine exhibit and show two four-cylinder touring cars, complete with top and touring equipment, fitted with 28 and 35-horsepower water-cooled engines. These are new models for 1906, the company's designers having been engaged on them for the past two years with the idea of producing a four-cylinder car of high power, great comfort, simple, light, easy of control, and of distinctive design. They claim that the cars now offered to the public combine all these desirable qualities. The machines are beautiful in appearance, and follow the latest designs of automobile development. A new primary and secondary distributor is fitted. Sliding-gear transmission, bevel-gear drive, are used. Lubrication is by Hill precision oiler. The cars are finished in green or carmine as desired. A runabout body can be fitted to either chassis. No runabout is, however, shown, this type being built to order only.

Windsor Auto Co. exhibits its 40-horsepower, four-cylinder, gearless transmission car, complete with touring body, Cape top and road equipment, and also a highly finished chassis. The last year's type was a 30-horsepower, but this is no longer manufactured. The car is claimed to be the simplest in the world, having absolutely no gears. On its transmission the company lays greatest stress. All speeds may be had on one lever. This transmission obviates the necessity of a split axle with differential. The company exhibits this year for the first time at any Eastern show, and is prepared to manufacture a large number of cars.

Dolson Automobile Co.—The new 1906 Dolson car is of 45-50-horsepower, with four-cylinder vertical motor and direct drive by bevel gear. The body is large and roomy, the surrey type, finished in Brewster green with red stripe. The 20-24 two-cylinder car is shown, also with bevel-gear drive, finished in Brewster green with black mouldings and red stripe.

Rauch & Lang Carriage Co.—Three of the electric vehicles made by this company are shown, the largest being a depot wagon in black and green. The Willard battery has 24 cells of 160 ampere-hour capacity, and the mileage capacity is from 75 to 85 miles. Two other cars with the same battery equipment and mileage are shown, a coupé and a stanhope.

Crawford Automobile Co.—The new 24-28-horsepower car has a four-cylinder engine with double chain drive, a special feature being the hinged hangers and ball bearings for the jack-shaft, with the strut-rod working on ball bearings on the jack-shaft bearing. The body is finished in French gray, with light green mouldings and gold stripe. The 10-horsepower two-seated runabout with two cylinders is shown, finished in lake.

Pittsburg Motor Vehicle Co.—A closed delivery wagon of 700 to 1,000 pounds capacity is shown, with single chain drive on right side. The left rear wheel is keyed to a solid axle, a sleeve on this axle carrying the right wheel. The differential case, which carries a large driving sprocket, is fast to the sleeve, thus driving the right wheel direct and the left through the rear axle. The Exide battery has 24 cells. The body is handsomely finished in maroon, with vermilion gear. The mileage capacity is 35 miles, at a speed of 11 miles.

Pungs-Finch Automobile Co.—The new Model H is shown in the stripped chassis, 28-32 horsepower, with four cylinders, in pairs, driving by central shaft. The complete car is shown with surrey body, roomy rear seats and wide side doors, finished in dark blue with light blue stripe.

Iroquois Motor Car Co.—The new 1906 touring car has a four-cylinder motor, 5 by 5 inches, of 35-40 horsepower, with central shaft drive. The frame is of steel plate, reinforced by angles. A special pattern of spring is used, with swell ends and suspension shackles. The 25-30 car, also with four-cylinder vertical motor and shaft drive, is shown, with detachable victoria top on the touring body, the color being crimson.

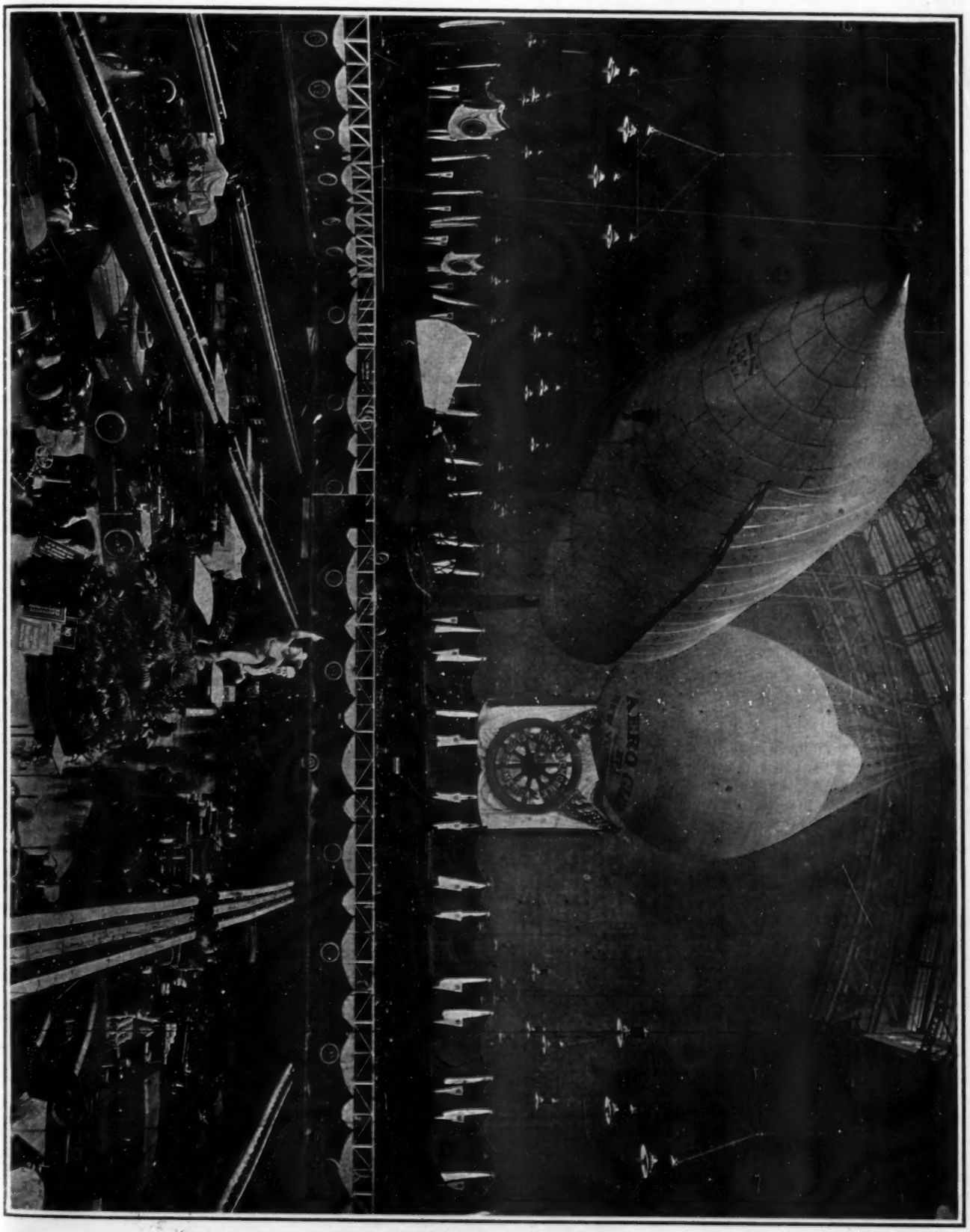
Aero Club's Exhibit.

Although very little has been said in advance about the exhibit of the Aero Club at the Armory outside of the announcement that it was to have an exhibit, much has been done and the club has been fortunate in securing a large number of full-sized machines, models, and photographs, which well represent the state of the art up to the present.

In the main hall suspended high overhead are two balloons marked "Aero Club of America." No. 1 is the property of Leo Stevens. Next to it is a dirigible balloon also owned by Mr. Stevens, and patterned as closely as possible on the lines of Santos-Dumont's airships. The long gas bag is made of oiled silk and on each side is a strip of silk doubled lengthwise over a strip of rattan and sewed to the body of the gas bag. To this rattan are attached loops of cotton cord from which the framework that supports the motor and propeller is hung and additional support is given by strips of cotton tape fastened over the top of the gas bag and having their ends fastened to the rattan.

The framework itself is of the form already made familiar by photographs of the *Santos-Dumont* and successive airships. Its cross-section is triangular and it consists essentially of three longitudinal strips of wood each of approximately triangular section and coming together at their ex-

INTERIOR OF THE ARMORY, SHOWING THE COMBINATION EXHIBIT OF BALLOONS, CARS AND ACCESSORIES AT THE CLUB SHOW.



INTERIOR OF THE ARMORY, SHOWING THE COMBINATION EXHIBIT OF BALLOONS, CARS AND ACCESSORIES AT THE CLUB SHOW.

treme ends. Between their ends they are supported by straight ribs spaced at intervals, these ribs being placed in groups of three to form triangles. Between each pair of ribs is placed a pair of diagonal stays which, however, connect not to the ribs but to the longitudinal wood strips. These stays are of steel wire upset at one end and threaded at the other, substantially in the manner of bicycle spokes. A motor (a 5-h.p. De Dion) is supported on two 1-inch angle irons and is steadied against rocking by short iron strips extending over the upper part of the crankcase to the ribs forming the adjacent triangle. From the motor the power is transmitted by a short sprocket chain with a moderate reduction of speed to the propeller shaft, which is a steel tube running in ball bearings and carrying at its front end (for the propeller is at the front end, not at the rear) a 2-bladed propeller measuring about 8 feet from tip to tip. The propeller blades are of canvas stretched on frames and it must be said that they do not look as if they were very securely attached to the shaft. The rudder is at the rear and the aeronaut it may be supposed clings to anything handy, as no especial seating provision appears to have been made for him.

There is also another balloon smaller than the first, with a tube depending from its lower end for some purpose doubtless more evident to aeronauts than to the general public. Both balloons and the gas bag of the airship are of thin oiled silk and of course substantially the color of varnish.

Upon entering the gymnasium from the Twenty-sixth street end, one's view is almost blocked by the famous Ludlow aeroplane, on which C. K. Hamilton recently made a successful flight over the Hudson River. Almost hidden by this aeroplane, which partakes of the nature of a box kite, is a very interesting exhibit by Mallet, of Puteaux, France. This consists of balloon baskets of various sizes, from the single passenger size to one capable of carrying five or six with comfort. There is also shown a large size balloon valve about two feet in diameter. This latter is placed on the top of a balloon, and is used to allow the gas to escape when one wishes to descend; it is operated by cords passing down through the neck of the balloon. Other balloon appliances are shown, such as anchors, grapnels, and the like.

The exhibit also includes many delicate recording meteorological instruments, such as barometers, thermometers, and anemometers, constructed with a special view for use in connection with kites and small free balloons called by the French *balloons soudee*. One instrument, known as the statiscope, might be mentioned; this indicates to the aeronaut whether his balloon is ascending or descending.

Just beyond this exhibit is one by the Blue Hill Observatory, of Milton, Mass. This consists mainly of box kites and meteorological instruments used in connection with them; it is supplemented by a fine collection of photographs.

Opposite to this last exhibit are two model airships about eight or ten feet long. One of these is loaned by Dr. Thomas, of Chicago; only the heel is shown; it is driven by a 1-horsepower Clement bicycle motor. The other is of the usual airship type, except that it is fitted with side aeroplanes, which aid in raising and lowering it, as their inclination is changed; this latter is known as the Keil balloplane.

On the west side of the center of the hall is the heel of the *Santos Dumont No. 9*, said to be the smallest man-carrying airship ever constructed. This is the machine which Santos Dumont calls his runabout, and which he hitches outside his window in the Bois du Bologne while he eats breakfast.

Opposite this, in the center of the hall, is the heel of the California *Arrow* (Baldwin's machine). This is the machine on which Knabenshue won the prize at St. Louis. Both of these latter have their balloons suspended about them in a deflated condition.

Beneath these machines, in showcases and on tables, are various models loaned by the patent office and private individuals, balloon fabric and materials, also many rare books and old engravings.

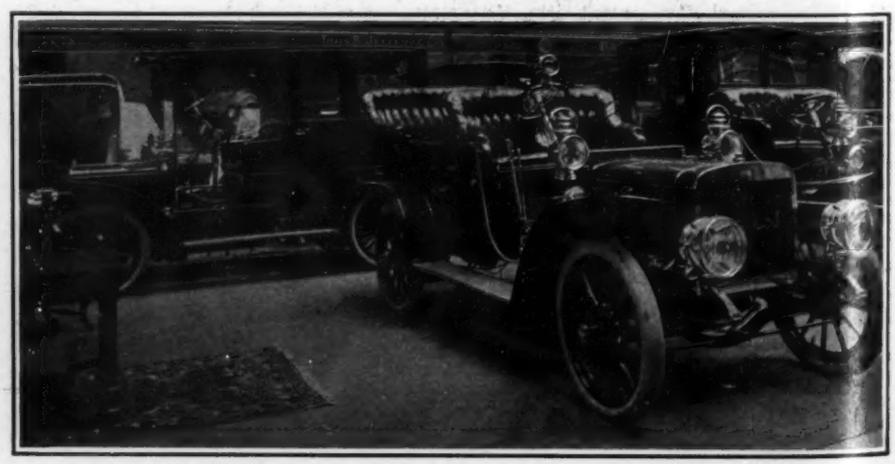
However, the part of the exhibit that represents real progress toward true flight is near the Twenty-sixth street end of the hall. This, everything considered, is remarkably up-to-date, and the Aero Club is to be congratulated on securing so good an exhibit on this branch of the art. Just over the showcases, near the center of the hall, hangs Herring's model flying machine. Side by side, a little further along, hang Professor Langley's two models or Aerodromes, as he calls them. The first one of these, propelled by steam, was completed in 1897. It made a flight of over half a mile on the Potomac River, near Washington, D. C., in that year. This model weighs about thirty pounds. It was started by launching it by means of a sort of catapault from the roof of a houseboat on the Potomac River. At the side of this hangs a later model constructed in 1903; this is almost a duplicate of the earlier model except that it is propelled by a small four-cylinder gasoline engine.

At the further end of the hall are the full-sized gliding machines of Lilienthal and Herring. The first of these much resembles a pair of bat's wings outspread, with a tail on behind. Lilienthal was the first man of whom authentic records exist who successfully soared in the air by means of an apparatus heavier than air. The method of using this apparatus was to run down a slight incline facing the wind and then jump into the air. The object of these machines is to study the action of the air currents and, if possible, to learn to imitate the soaring flight of birds. Both Lilienthal and Herring have claimed that on many of their experiments they at times rose higher than their starting points. Herring's machine partakes of the nature of a box kite with a combined horizontal and vertical rudder at its rear.

Around the sides of the hall are many large photographs of balloon ascensions, airships, and various other interesting things relating to the subject of aerial navigation. It is impossible to even mention these and a great many other things in this exhibit. Messrs. Herring and Leo Stevens are in attendance at this exhibit and try to answer all reasonable questions which may be put to them by visitors.

Joseph Tracy the well known amateur driver, who made such a splendid showing in the Vanderbilt race last summer, arrived in New York last Sunday on the S. S. *Lucania*, after a stormy voyage. Mr. Tracy went abroad to visit the Paris show, and spent some time in England making technical investigations. He brings back with him the Schultz monograph, a machine for indicating automobile engines. Mr. Tracy timed his arrival so that he might be present at the New York shows.

Frozen ruts in the road are terribly hard on tires, wearing down the rubber like a file.



CLEVELAND CLOSED AND OPEN GASOLINE CARS ON VIEW IN THE ARMORY.

News Notes of the New York Shows.

THROUGH the courtesy of the A. C. A. Exhibition Committee a large room over the gymnasium in the Armory building and adjoining the rooms used by the A. C. A. for the same purposes, was set aside as headquarters of the Long Island Automobile Club during Show week. Members of the L. I. A. C. used the temporary clubroom as a rendezvous and a welcome refuge from the "madding crowd" after the somewhat tedious inspection of the exhibits. All the prominent trade publications were on file, besides a comprehensive array of the various catalogues of the firms exhibiting cars and accessories. The Long Islanders, not to be outdone in courtesy by the Exhibition Committee, offered the use of the room to all Brooklyn automobilists, regardless of club affiliations, with the result that the car owners from across the river foregathered there in large numbers, at all hours every afternoon and evening during the show. Edwin Melvin and W. G. Pierson alternated in doing the honors.

*

The Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., took advantage of the shows to offer a neat and much-appreciated compliment to its many friends and patrons. Securing a private dining room at the Café Martin, Fifth avenue and Twenty-sixth street, it issued neatly engraved invitations to them to sit down to luncheon as the company's guests any day during the week. Much difficulty is often experienced in being served with luncheon during Show week, especially at the noon hour.

*

Press men in search of information are, as usual, forced to climb many stairs to reach the publicity departments of the shows. But having arrived, the treatment accorded the newsmen is all that could be desired. In the matter of convenience and cleanliness the Armory press quarters outshine those in the Garden. Messrs. Batchelder and Reeves, presiding over the respective bureaus, have been the hardest-worked men in New York before and during the shows.

*

The aerostatics feature of the Armory show attracted thousands of curious visitors. There were numerous exclamations of disappointment when the fastenings which held the two huge gas bags and the Santos Dumont machine to the roof of the big drill hall were first discovered. The majority of the crowd seemed to think that the air navigating machines should have gone to the roof and stayed there of themselves. The secret of the phenomenon was that the bags contained nothing but air.

*

Captain Homer W. Hedge is in charge of the details of the annual banquet of the Automobile Club of America, which winds up the show festivities on Saturday night. The affair will be held at the Waldorf-Astoria, and from present indications will be largely attended. Many speakers prominent in automobilism are scheduled to respond to toasts.

*

The White Company did a neat little bit of business on Monday afternoon when a White car, with full touring equipment, was sold to W. K. Vanderbilt, Jr. It is understood that Mrs. Vanderbilt made the selection.

*

Harry Payne Whitney invested a little pocket money in a 75-110 horsepower special racing Leon Bollée racer on Monday.

*

On Saturday afternoon, January 13, the Exhibition Committee of the Sixth Annual Show of the Automobile Club of America gave a private view of the decorations to club members, invited guests and the press at the Sixty-ninth Regiment Armory, Twenty-sixth street and Fourth avenue. From 4 to 6 o'clock several thousands took advantage of this opportunity to inspect the magnificent new building and the 1906 models of the more prominent American and foreign automobiles. Each member of the club was privileged to bring one or more guests, and with the pleasing strains of Bayne's Sixty-ninth Regiment Band to enliven the occasion, the good-sized crowd apparently enjoyed the affair to the limit. Men and women prominent not alone in automobiling, but in the affairs of city, state and nation as well, took advantage of the club's courtesy.

*

The scene from the topmost gallery of the Garden, whither many of the sight-seers wandered, reminded one forcibly of the "greatest and only show on earth." From this vantage point the roof side of the pea-green, star-spangled firmament resembled the upper works of a three-ring circus, beneath which the huge crowds could be dimly seen meandering from exhibit to exhibit. The cheese-cloth effect gave a softened tone to the scene, which was evidently grateful to weary lovers, for many couples occupied the dusty seats, regardless of the huge piles of impedimenta which had been hastily stored there to get them out of the way.

*

A statistical fiend claimed to have counted 18,437 stars in the Garden's imitation heaven. He even went further, and stated that, according to his calculations, there were 46 1-2 miles of stitching required to hold the thousands of yards of 3-4-yard-wide goods together.

*

Many exhibits were installed on Sunday. Especially was this the case at the Armory, where cars were being run into the building all day. The height of the main floor from the street level rendered necessary the use of block and tackle in getting the vehicles up the stiff incline—a stringent order having been issued prohibiting the cars doing any hill-climbing stunts under their own power. Once inside, the cars of some of the less fortunately located exhibits had to be lowered to the basement by the same means. Before dark, however, the last exhibit had been finally arranged, and the finishing touches put on cars and stands in preparation for the reception of the expected big crowds.

*

The installation of the company-room exhibits in the Armory required much backing and filling before the various cars were stored away to the best advantage. These rooms, however, are admirably adapted to the purpose, and once installed the general effect was admirable. Indeed, some of the exhibitors claimed that these rooms were to be preferred to main-floor locations, where the effort to secure a general pleasing effect so merged one exhibit into the next that the individuality of each was very much lessened. As one of these company-room exhibitors put it: "We are of the main exhibition, and yet have our private showrooms."

*

Each show was visited on Sunday by several thousand spectators, mostly exhibitors and friends. Many of the latter were unprovided with the necessary credentials to secure admission, and it required much persuasion on the part of the tradesmen to induce the doorkeepers to disobey their orders to admit only exhibitors, assistants and press men. The explanation, "Our agent from Chattanooga"—or somewhere else—usually lowered the bars for the outsiders, however.

*

"While comparisons are hardly in order," said a show sharp, "one with an eye for the fitness of things is compelled to admit that the general effect of the Armory show is better than that of its rival up the street. The color effects are more harmonious, more soothing to the eye; the names of the exhibitors stand out in bolder relief; the decorative feature is not overdone—there has been no overreaching in the effort to secure a picturesque effect; there is plenty of light, both natural and artificial. The Garden scheme has a tendency to shut out daylight almost entirely, the effect, especially in the afternoon, when the sun and the electric lights are in conflict, being somewhat on the bizarre order."

*

The operation of filling the suspended silken bags of the Aero Club's display at the Armory furnished a daily sensation to the crowds. Much surreptitious smelling of the huge oiled silk supply pipe coming down over the gallery rail to the bag to be filled was indulged in. Many of the spectators declared they smelled gas. They didn't—the filling was nothing more dangerous than New York air, supplied by a rotary pump driven by an electric motor and

installed in the Aero Club's exhibit room on the upper floor.

*

Exhibitors of accessories on the upper floor rooms in the Armory were disadvantageously placed. It was only after a long hunt through the various rooms, necessitating much stair-climbing, that the visitor was enabled to find the particular exhibit he was in search of. In this respect the Garden exhibitor of sundries had the advantage. It was possible to locate his sign from the main floor and reach his stand by the most direct route.

*

A pulley dropping from the roof of the Armory on Sunday punctured the gas bag of Santos Dumont's's "runabout," but the damage was repaired before nightfall and the bag refilled.

*

In the matter of caring for the wants of the inner man the Garden exhibitor had a distinct advantage over his confrere at the Armory. Not only were the accommodations at the former more adequate to the demands—400 could be attended to at one time—but a special table d'hôte luncheon could be had from 12 to 3 P.M. for the modest sum of 60 cents. Elaborate dinners could be had at proportionate rates from 3 to 10 P.M. At the Armory the caterers were compelled to get along the best they could with gas stoves temporarily installed, the result being a rather ordinary buffet luncheon of the coffee-and-sandwich variety. As a result, the restaurants outside the Armory did a land-office business at midday and in the evening at dinner time.

*

Never before in the history of the Bell Telephone Company have such comprehensive semi-public telephone systems been installed as are in operation at both Garden and Armory. In the former not less than 130 instruments are in constant use at the exhibitors' stands—these in addition to the public telephone booths on the main floor at each end of the building. The Garden 'phones all connect with the Madison Square station direct, there being no "central" in the building. At the Armory the 110 exhibitors' 'phones and those in the public booths work through a temporary "central" on the main floor. Some idea of the magnitude of the installation may be had from the statement that not less than 60,000 feet of wire were put into both buildings last week, and not a foot of it in sight except that leading from the separate instruments to the main and branch lines! The convenience of this mammoth but temporary enterprise cannot be estimated, but that it will save millions of steps and thousands of hours' time in the aggregate during the week may readily be believed.

*

A clever advertising idea is made use of by the Reo Motor Car Co., of Lansing, Mich., in illustrating the working of a four-cycle gasoline motor by means of a "thumb-book," which, when manipulated, shows a section of a cylinder with all the parts moving properly, the vapor moving in and out as it should, and the flywheel revolving. A complete cycle is performed by these moving pictures, seventy-three separate half-tones being required to make the little book, which is given away at the Reo stand at the Armory show.

*

A feature of the Armory show which attracted many sightseers to the theater on the fourth floor was the hourly reproduction by the Vitagraph of the Vanderbilt Cup Race, the Gordon Bennett cup races in Germany and Ireland, the 1905 Ormond beach races, the latest flights of the Lebaudy and Santos Dumont airships, and the Archdeacon Aeroplane; the Mount Washington "Climb to the Clouds" of 1904, the Dover-Calais motor boat races, and some dozen other allied subjects. Although the small theater was comfortably filled at each performance, the stair-climbing entailed, and the fact that there were no signs about the Armory indicating just where the theater is located, deprived many of a most enjoyable entertainment. L. Edward Roskam managed the affair for the A. C. A., admission tickets being distributed gratis by the Exhibition Committee.

*

There was no dearth of music to accompany the dulcet strains of the conversation artists at the exhibitors' stands. At the Garden from 2 to 5 each afternoon and from 8 to 11 in the evening the band of Leader Gustave D'Aquin held forth in the upper gallery at the Madison avenue entrance. In the Armory the Sixty-ninth Regiment string orchestra of twenty-five pieces held forth in the band stand, which was suspended from the arch at the rear end of the building. The acoustic properties of the Armory are not of the best, but Leader William Bayne made the most of his opportunities.

*

The colored-light effect on the peristyle covering the "poster girl" at the entrance to the Garden show attracted the visitors' attention immediately upon entering.

*

A. Mendoza, chairman of the Racing Committee of the Cuban meeting, on Monday advised A. Masenat, general manager of the Panhard & Levassor Company, that the Cuban Government had remitted the duty on all touring and racing cars for a period of six months.

*

The first "sold" sign to be displayed in the Armory appeared on Monday afternoon on one of the White touring cars with cape top.

BY MOTOR SLEDGE TO POLE.

The Corbin concern, it is rumored at the Armory Show, has entered into an arrangement to construct several motor-skis or sledges, which are to be used in the attempt of Santos Dumont and Walter Wellman to reach the North pole. These self-propelled sledges will, it is said, be used in place of the Eskimo dogs, which are much too slow for the work of hauling supplies, the latter failing before the expedition gets within striking distance of the pole.

The plans of the adventurers include an airship dash for the pole from Spitzbergen. The sledge party will not winter at the latter place, but will push on, hoping to meet the aerial pole-discoverers on their return.

The specifications of the auto-sledges, so far as can be learned, include a triangular-shaped frame with runners, driven by a single rear wheel by chain transmission, the drive wheel, eighteen inches in diameter, being studded with steel points to give the necessary traction on the ice.

The whole project, it is learned, hinges upon the success of an effort to discover a non-freezable fuel which may be used in the motors. A commission of automobile engineers and chemists, so the story goes, is working overtime in the quest for such a fuel.

RACING BOARD MEETING.

Vote to Recommend Recognition of Cuban Racing Association.

A special meeting of the Racing Board of the American Automobile Association was held in the Sixty-ninth Regiment Armory on Monday afternoon. Owing to the absence of Chairman Robert Lee Morrell, due to the tardiness of the train on which he was coming from Virginia, W. K. Vanderbilt, Jr., occupied the chair. The others in attendance were E. R. Thomas, James L. Breese, George Isham Scott, R. L. Lippitt, A. L. Riker, Secretary A. G. Batchelder, and ex-Chairman A. R. Pardington.

It was voted to recommend to the A. A. A. Board of Directors that official recognition be given to the International Automobile Racing Association, of Cuba, under the auspices of which body will be held the racing carnival scheduled for February 4, 5, and 6, a fortnight following the Ormond-Daytona meeting.

A substantial surplus having resulted from the capable management of the 1905 Vanderbilt Cup Race by Chairman Morrell and his associates, it was voted to use the money in furthering the general work of the A. A. A.

Mr. Vanderbilt is scheduled to leave for the other side some time next week, and when he reaches Paris he is to confer with the officers of the Automobile Club of France relative to the Vanderbilt Cup, which in all likelihood will soon be on its way to this country. Should the French organization decide not to hold a race for its possession, it is certain that the emblem will be contested for on Long Island next Fall.

The Automobile Outing Company, of Baltimore, Md., has opened a salesroom and garage at 2207-2209 Madison Avenue, Baltimore, where it will sell Columbia gasoline and electric cars.

Preparations for the Chicago Show.

THE Chicago Coliseum and the First Regiment Armory, in which the automobile show will open on Saturday, February 3, will be decorated according to a uniform plan by the promoters; the general scheme has already been described in THE AUTOMOBILE, but some additional details are now given.

The roof and walls of the Coliseum and the roof of the Armory will be decorated in white and gold, and hardly a square foot of either will be visible. The Flemish oak paneling on the walls will extend to a height of ten feet, and the background will be green and gold. Above there will be a cornice of staff work in various automobile designs, bearing opalescent electric lights. The decoration which covers the roof will extend under the galleries and will meet the top of the wall decorations.

A great deal of staff work is to be used in the signs and the pillars which support them. The latter will vary from eight to twelve inches in diameter, and will run to a height of eleven feet, supporting the sign proper, which will be fifteen inches wide, of black and gold. Suspended from this sign will be a shirred satin drapery three feet in depth, and in front of this, suspended by chains of old English design, will be a row of shields, each shield bearing a letter, the combination of shields forming the name of the car exhibited in that particular space. The drapery will be of old gold and the shields will be deep blue with gold trimmings. The letters will be of enamel and raised one-half inch. At the top of the sign there will be staff work of suitable design fifteen inches wide, and above this again groups of three and five electrically lighted globes, twelve and sixteen inches in diameter, supported by arms of staff.

Not a pillar or obstruction will be visible in either of the buildings. The pillars of the Coliseum spring directly from the floor and have long been a source of worry to exhibitors. This year they will be included in the paneling and lighting scheme, as described, so that exhibitors under the Coliseum gallery will be practically enclosed in private rooms, the front only being open.

Extraordinary lighting effects have been arranged for in the spaces, the Chicago Edison Company having provided a set of fixtures of unusual brilliancy which have never before been shown to the public.

The scene on Michigan avenue during the show will, if the weather is reasonably good, be a highly interesting one. Demonstrating cars of the exhibitors of the Coliseum will, as usual, line up on Wabash avenue, and then proceed by way of Fourteenth street to Michigan avenue, and there mingle with the long line of demonstrating cars maintained by exhibitors of the First Regiment Armory.

In order that full advantage may be taken of this scene, the management has provided and arranged for the operation of one of the most powerful searchlights ever used in Chicago. The light will be placed on a special structure above the roof of the Coliseum, so that the avenue may be swept for miles.

Special rates have been granted by the railroad companies, which will enable out-of-town automobile people to reach the Chicago Automobile show and return to their homes for one and one-third fare on the certificate plan. The reduced rates, however, apply only to members of the American Motor League and of the American Automobile Association. To the former a special rate has been granted by the Western, Central, and Trunk Line associations.

The American Automobile Association has secured the same concession from the Central, Trunk and New England associations, and Secretary Batchelder reports that concessions are expected from the Western, Southeastern, and Southwestern associations.

The railroad agents, with the secretaries of the two automobile associations, will have offices on the first balcony of the First Regiment Armory.

Arrangements have been made so that the public can pass from the Coliseum to the First Regiment Armory, or in the reverse direction, entirely under cover. A passageway five feet wide and eight feet high will connect the two buildings.

The Chicago Automobile Club has arranged for headquarters at the show. Secretary Gorham or Assistant Secretary Mead will be in attendance at all times.

BUFFALO SHOW ALLOTMENTS.

BUFFALO, Jan. 12.—Allotments of space at the fourth annual automobile show of Buffalo, to be held in Convention Hall, March 5 to 10, next, have been made to the following concerns:

J. A. Cramer, Jaynes Automobile Company, G. N. Pierce Company, E. R. Thomas Motor Company, Centaur Motor Company, Babcock Electric Carriage Company, P. W. Eigner, Buffalo Automobile Exchange, Brunn Carriage Company, Buffalo Motor Car Company, Walter Hayes, G. H. Poppenberg, Palace Motor Car Company, Knox Automobile Company, Ford Motor Company, Kane Champlin Company, Auto Car Equipment Company, O. K. Machine Works, F. I. Alliger, Twyford Motor Car Company, Alexander Weller Company, American District Steam Company, Michelin Tire Company, The Kelsey Company, Buffalo Gasoline Motor Company, Gray & Davis, D. H. Lewis, Badger Brass Mfg. Company, C. E. Miller, Warner Instrument Company, Hartford Suspension Company, National Battery Company, Thomas Auto-Bi Company, Edmunds & Jones Mfg. Company, Neal, Clark & Neal, Weed Chain Tire Grip Agency.

There are more applications, but space has not yet been allotted.

COLUMBUS AUTO SHOW.

Board of Trade Promoting the Scheme, Auto Association Co-operating.

COLUMBUS, Jan. 13.—Columbus is to have an automobile show and it is purposed to make it surpass anything of the kind in this section of the country. The board of trade, an exceedingly enterprising and active body, is pushing the project and has approached the largest manufacturers in the city to enlist their co-operation. This has been promised, and all the manufacturers in this country and many in Europe will be invited to participate.

The board of trade has never yet taken hold of a movement that did not result successfully, and in this venture it is probable their efforts will be crowned with the best kind of success. Columbus is one of the important automobile manufacturing centers and the show will undoubtedly materially boom the industry here.

The Columbus Automobile Association will do everything possible to make the event a success. The promoters are now at work on the details, which will be announced soon.

TORONTO SHOW DATES.

First Week in April Selected for Canadian Exhibition.

TORONTO, Jan. 15.—Preliminary arrangements have just been completed for the first national exhibition of automobiles, motor boats, and accessories to be held in Canada. It will be known as the International Motor Exhibition and will be held in the Granite Rink, Toronto, commencing March 31 and continuing from April 2 to 7, inclusive.

The show will be under the direction of a committee of Toronto dealers, of which G. H. Gooderham is chairman. E. M. Wilcox has been appointed manager.

The Granite Rink, in which the show will be held, is well fitted for the purpose. It consists of two buildings, a curling rink and a skating rink, with a total floor area of 24,000 square feet. The greater part of this space is already contracted for exhibits comprising a large proportion of American and foreign cars as well as those manufactured in Canada. The remainder is being taken up principally by exhibitors of motor boats, marine engines and automobile accessories.

All of the committee are in attendance at the New York shows this week, where they are securing as many pointers as possible to assist them in making their own show a success.

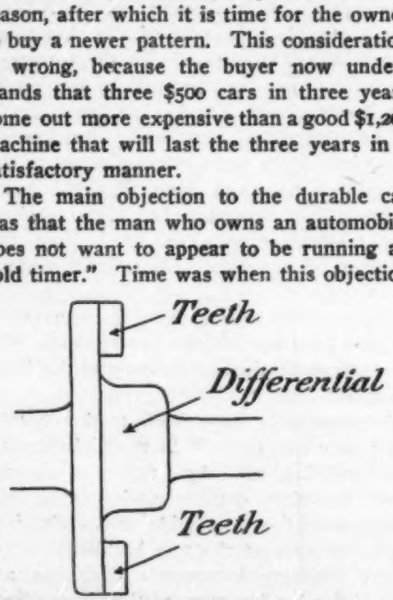
"SMALL" AND "POPULAR-PRICED" CARS.—I.

By RENE M. PETARD.

PARIS, Dec. 29.—The wording of the title of this article may appear to the American reader to be somewhat redundant since the state of the market up to the present has been such that a popular priced machine has never been anything but a small car, and that a small car has generally been sold at a popular price. From what could be seen at the Paris Salon, however, and from what is to be learned in technical centers in Paris at present, the small car and the popular car are to be in future, on this side of the water at least, two entirely distinct classes of machines—for some time at any rate. The small car is generally a two-seater, sometimes a spider or a similar addition, such as a folding seat, allows to make a three-seater out of it, in case of an emergency. It is generally low powered, and has seldom more than one cylinder to its engine. Its construction and design are generally quite special and out of the standard lines of automobile conception, and taken as a whole the entire mechanical plant gives evidence that the machine was intentionally made to answer only very limited conditions, but to answer them in the best possible way. Such "small cars" are termed in France *voiturettes*, and a universally known pioneer machine of this class, was the 4 1-2-horsepower, motor-at-the-back, De Dion cars, which gave and are often still giving wonderful service. The advantages of this type of car, when soundly made, usually appeal more specially to professional men, of sometimes limited means, who however must of necessity have some means of transportation to be used under all sorts of conditions to carry them about in the course of their business. The well-thought-out and the well-made small car is undoubtedly the least expensive way known of traveling either about cities or through the country for moderate distances. The up-keep is lighter than that of a horse and buggy, and when the convenience of stopping anywhere and without losing any time is considered it is seen that the machine is actually cheaper than the surface car or the underground railroads. The fuel and tire expenses are very low, the machine being light and the motor being of a low power. The handling of the car is very easy and no special mechanical abilities other than sympathetic care and common sense are required to keep the vehicle in fit running condition or even to attend to or at least supervise what repairs may normally be expected to be needed from time to time.

Machines of this type have been made in France ever since the beginning of the automobile movement, and most excellent results have been obtained from the majority of them, some makes, however, falling into the same notion which some foreign runabout makers openly confess to consider as correct, that a small car, let it be a runabout or a voiturette, only needs to last a season, after which it is time for the owner to buy a newer pattern. This consideration is wrong, because the buyer now understands that three $500 cars in three years come out more expensive than a good $1,200 machine that will last the three years in a satisfactory manner.

The main objection to the durable car was that the man who owns an automobile does not want to appear to be running an "old timer." Time was when this objection



DIAGRAMMATIC SKETCH OF SIZAIRE & NAUDIN DRIVEN GEAR ON REAR AXLE.

was good, but that time has gone by, for nowadays the exterior outline of the automobile is sufficiently settled to make this consideration obsolete.

In short a small car worth attention should be a machine intended to carry a narrowly limited number of passengers at a reasonable speed, the initial cost and the upkeep cost of which will be as low as possible while the materials and the design of the machine must be such that the car will be just as long-lived as any other.

The popular priced car, on the contrary, is at present, as evidenced at the show, an entirely distinct proposition. It is a machine intended to carry four or five persons in fair comfort in a body of the conventional type, in most cases with a side entrance or at least with a revolving front seat, amounting to practically the same as a side entrance. The machine will be strongly built in proportion to the load it has to carry and the increased speed it has to travel at, which consequently means reasonable power. As a whole the machine will reproduce, almost without reduction, the general proportions of the modern touring car, but the disposition of the parts and the study of the details must be such as to permit a considerable reduction in the price without impairing the strength or the lasting qualities of the machine.

From this it will have been understood that the popular-priced car should embody the advantages of the small car as to simplicity, inexpensiveness and ease of upkeep, at the same time borrowing from the touring car its comfort and appearance as well as its increased capacity. That this type of car will be the car of the future, in the classes under consideration, is evident, as it answers the requirements of the great majority of the people and is the result of the development of the automobile from an article of luxury or else of limited usefulness to a practical machine for ever-varying purposes. The simultaneous development of this type of machine and of the commercial vehicle which we now witness shows that a field broader than any that was ever before opened to the automobiles is now within reach.

The most striking example of small cars exhibited at the show undoubtedly was the Sivaire & Naudin, this machine, barring some rather daring innovations, which must not be condemned, but which want the test of time to be judged, is soundly and most cleverly built. To arrive at a good, moderate-priced and comfortable solution of the small car problem the makers have not hesitated to step boldly out of the beaten track and to study, not the existing parts of the standard type of car to make them cheaper, but to carefully consider what would be the possible conditions of work of such a car as they wanted to build, and to design parts especially suited to these particular conditions. This resulted in some rather unexpected but yet apparently good solutions of the problem.

As will be seen from the accompanying illustrations the frame consists of two very strong section wood sills, not armored in any way, but more than strong enough for the duty they have to perform. These side members are narrowed out at the front, as is the ordinary practice in pressed steel frames. The chassis proper is completed by tubular steel cross members very strongly attached to the sides, the body itself forming the rear frame part, the frame's sides alone extending to the back of the car. This frame is said to be extremely light; at any rate it is much stronger than the average small car frame.

At the front of the machine, under a simple hood with vertical radiator in front is the power plant consisting of the motor with all its accessories attached rigidly to it, no other support than the engine's own

lugs being needed. The motor is a single cylinder vertical, fitted with mechanical valves, the inlet one being operated by means of an overhead tappet; the valves are one above the other. The power is 7-horsepower at 1,400 revolutions, which is the normal speed, but can be accelerated to give 9- to 10-horsepower under favorable weather conditions. The carbureter is automatic, and, combined with the efficient muffler and well designed piping, makes, perhaps, the most silent single cylinder motor which ever came under the writer's notice, this being attained without any appreciable back pressure at the silencer as evidenced by the comparatively low temperature of the exhaust leads after a very severe hill test.

While this question of temperature is being maintained it might be added that the radiator, which is of quite special construction, is also remarkably efficient. It consists of a cast bronze frame, the top and bottom parts of which are united by fifty eight gauge, vertical, small copper tubes. The efficiency of this is remarkable, especially when the total absence of radiating fins is considered. In the Mount Ventoux hill climb last year, where the first sample of this machine made a very nice showing, no loss of water was found to have taken place through evaporation, after 21 kilometers of steady climbing. The small quantity of water contained inside the radiator frame and the tubes would not be sufficient to answer the cooling requirement completely, and in consequence a separate water tank is provided which forms the top part of the dashboard, as is illustrated. Between the motor and the radiator a cubic mass is found which consists of the fuel tank, placed in front and above the carbureter in order to insure a reliable and complete flow of gasoline to the latter. Solidly fastened to this tank is a long flat wooden box which contains the ignition battery and the coil, the wiring being very short, since it simply runs from this box to the motor, which is right against it.

The lubricating oil is contained inside a small tank carried on the motor block and feeds automatically, so that the only attention required is occasional refilling of the tank.

One of the noteworthy features of this car and, perhaps, that which needs most to receive the consecration of time is the front axle construction, or, rather, the absence of front axle, as one of the photographs shows. The front of the frame is formed by an I-section steel forging carrying a vertically bored sleeve at each end. Inside this sleeve and free to rotate as well as slide lengthwise are two vertical spindles which form part of the front wheel hubs. The sleeves are normally kept at a given distance on the length of the spindles by means of the front transverse spring also shown, this being carried by a bracket formed on the cross member. At first sight it would seem that the fact that a long part of the vertical spindle is always protruding below the axle, with the result that the hubs are apparently not sufficiently held, the distance between the axis of the hub and that of the sleeve being rather too great, making a weak wheel support. This, however, is a point which will easily be settled by more extended road practice.

The drive is by live axle, the change speed gearing, instead of being placed on the frame proper, as is the usual practice, is formed inside an enlarged portion of the differential casing, the idea being somewhat similar to that in the American Packard cars, the system of gear change, however, being entirely different, and based on a new principle, which is as follows:

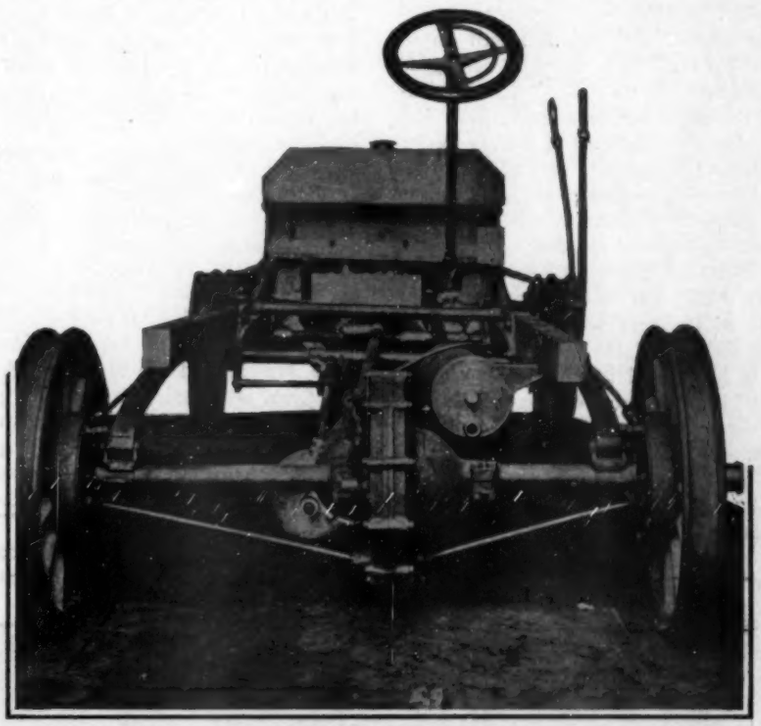
The differential—which is placed as in all other live-axle cars—instead of carrying a large bevel wheel, carries a disk with teeth cut on the face of it in a plane perpendicular to the axle. Alongside of this disk runs the extension of the propeller shaft inside the box. This extension, which is of the very best of special steels (this being permitted in such a low-priced car by its very small size), carries three pinions resembling very much ordinary spur pinions, which, by means of a cam action actuated by the usual lever, are at first drawn away from the disk by an eccentric and then slid until the desired one is in front of the teeth on the disk, when the whole set is again brought against the disk, the proper pinion only thus coming into mesh with the others. The advantage of this is, first of all, great simplicity and then a direct drive on all speeds but the reverse. This gear is quite up to the same standard as the engine as concerns silence, and the whole machine works wonderfully smoothly and quietly.

Apparently a drawback to this system of drive is that absolutely special shapes of gear wheel teeth are required, which means special machinery. A most remarkable point is the small size of the gears it allows, since the low gear is only 35 mm. in diameter (less than 1 1-2 inches), while the third speed gear is 100 mm., or approximately 4 inches.

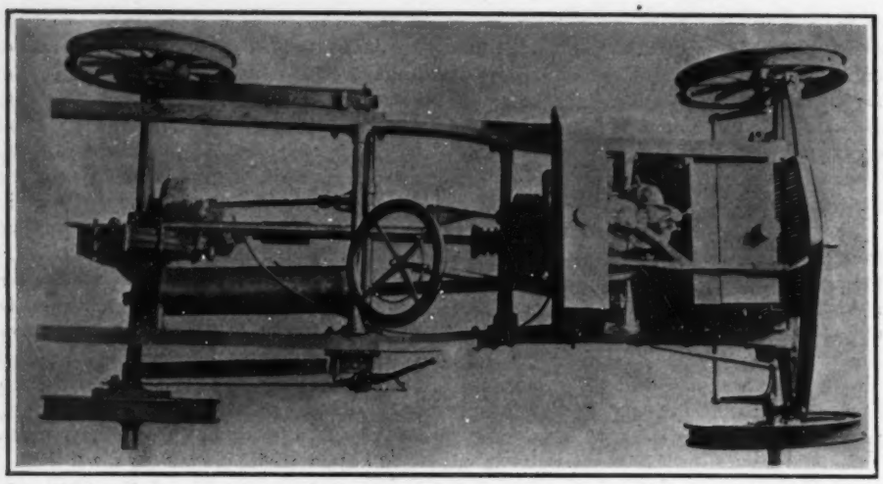
The top speed of the car on the level is from thirty-four to thirty-five miles an hour. The steering gear is absolutely irreversible, but this particular point (although the writer was able to convince himself of the absolute truth of the statement) does not appeal as very advantageous, for reasons explained in another article.

The rear springs are of the one-fourth elliptic type (see illustrations) and are strongly attached to the frame sides at their forward end and to the axle at the back end. A strong radius and torsion rod is used, which comes right from the axle to the back of the engine. Such a spring system as that on this machine is unusually easy riding, the comfort found in this little car, even on very rough roads, being seldom attained in other types of cars. The main point about it, however, is that especially for the rear springs only the very best of special spring steel must be used and scientifically treated, as the strain on the suspension appears to be very great at all times. The proportions of the springs, however, are ample.

For a closing word as regards this special car mention should be made of the construction of the clutch and of the automatic spark advance. The clutch merely consists



REAR VIEW OF SIZAIRE & NAUDIN SMALL CAR CHASSIS.



PLAN VIEW OF THE FRENCH SIZAIRE & NAUDIN SMALL CAR CHASSIS.

of a metal disk held by a strong spring into driving contact with the full web on the motor flywheel. This clutch is very gradual and gentle in its action, sudden releasing of the pedal having actually been done in the writer's presence and the car having, notwithstanding, taken a very gradual start, no part seeming to receive any undue strain in the process. Another rather exceptional and not-to-be-recommended performance was to change gears without taking the clutch out in order to demonstrate the advantage of the gear wheels being brought into mesh with all their width at once instead of being slid into place. This "advantage" is to be found on some other cars, but in none, to the writer's knowledge, as simply as in this case.

The automatic spark advance is obtained by sliding the ignition cam longitudinally by means of a centrifugal governor. The advantages of this, which are very dubious, could not very well be discussed within the limits of this article; it should be recorded, however, that the system appears to work satisfactorily on this machine in very varying conditions of engine load, which fact has seldom been obtained by inventors of similar apparatus.

Further discussion of cars under this heading must be deferred for subsequent treatment, as the hour of closing transatlantic mails is very close.

(To be continued.)

MUSKEGON-GRAND RAPIDS ROAD.

MUSKEGON, MICH., Jan. 13.—Dr. C. J. Dove, president of the Muskegon Automobile Club, is planning one of the greatest feats of good road construction ever attempted in Michigan. It is his purpose to construct a gravel automobile road from this city to Grand Rapids, a distance of forty miles.

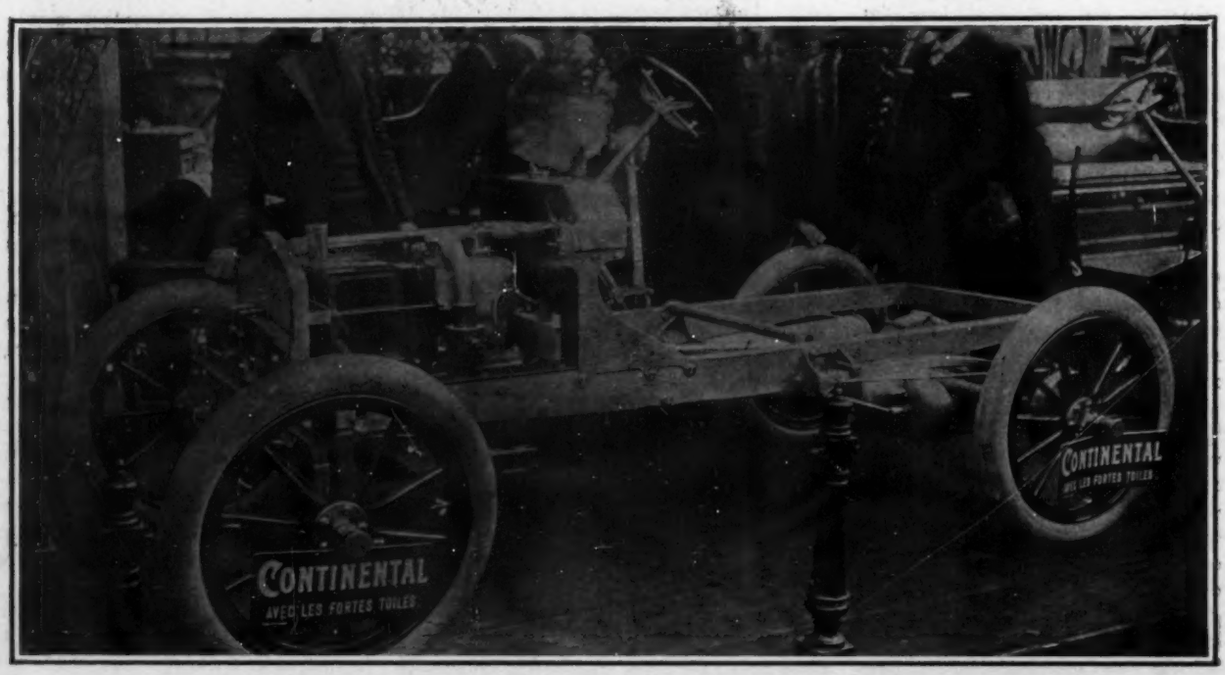
He will call a meeting of good roads enthusiasts, to be held at Grand Rapids about January 15. At this meeting Grand Rapids automobilists will probably join in the movement, and farmers and township officers from points along the proposed highway, including pathmasters and highway commissioners, will be asked to participate.

The road is already cut through but has a very poor surface. There is also some grading to be done. With the aid of the state reward good roads law, by which a mile of good road is built by the state for every mile built by citizens, Dr. Dove hopes to attain the object for which Grand Rapids and Muskegon automobile owners have been striving for a long time. About thirteen miles of the road is in good condition but the rest will have to be rebuilt. The assistance of the township boards along the road will be invoked and it is probable that it will be forthcoming.

STATE AID IN MINNESOTA.

ST. PAUL, Jan. 13.—Minnesota now has a highway commission which has just been appointed by Governor Johnson, and owners of automobiles all over the state are rejoicing in the prospects of good roads. The commission was created by the last legislature and became an entity on the first of the year. One of the members of the commission at least, Gustave Scholle, who is one of the leading members of the St. Paul Automobile Club, is a member of the new highway commission and will look after the interests of the autoists in the matter of securing good roads.

Under the state aid act relating to the construction and improvement of public highways, a tax of one-twentieth of a mill on each dollar of valuation is to be levied annually. It is hoped that many ideal roads may soon be open to the auto enthusiasts of Minnesota.



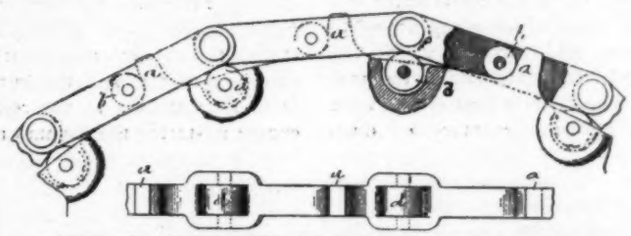
SIDE VIEW OF THE SIZAIRE & NAUDIN SMALL CAR CHASSIS EXHIBITED AT THE PARIS SALON

Patents

Sprocket Wheel.

No. 807,363.—J. M. Dodge, of Philadelphia.

A sprocket-wheel whose first peculiarity is that the teeth *a a* are intended to engage rollers *b b* at the centers of the chain links instead of at the pivots of the links, as usual. The pivots of the links do not comprise rollers, but are arranged to ride on rollers *d d*, carried on pins in recesses in the sprocket wheel. To form these recesses the wheel may be expanded where it carries the rollers.



DODGE SPROCKET WHEEL WITH ROLLERS IN PERIPHERY.

Sanding Device.

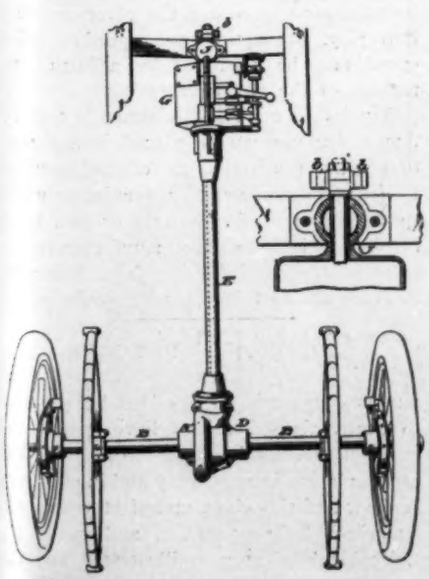
No. 807,186.—A. L. Moss, of Sandusky, Ohio.

This is a sanding device quite similar to that used on railroads, except that air is compressed into a reservoir adjacent to the sand tank by a small pump, and is employed in connection with the sand to blow the latter from the distributing pipes near the rear wheels.

Transmission and Axle Construction.

No. 806,933.—T. Stafford, of Topeka, Kan.

This arrangement is designed to take the place of the customary universal joints in the propeller shaft. The shaft rests in a sleeve casing *E*, which is rigid with the axle-casing *B D*, and is rigid likewise with the case *G* of the transmission gear. The necessary flexibility is obtained entirely by a large hollow ball joint *J*, through which the driving-shaft from the motor passes, and in which said shaft has a bearing. A universal joint *b* connects this shaft with the clutch.

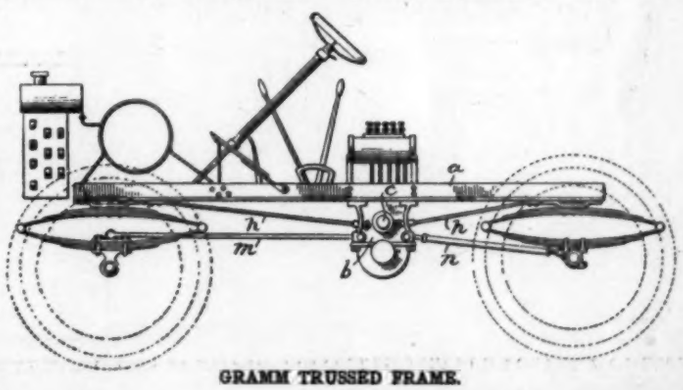


STAFFORD TRANSMISSION AND AXLE.

Trussed Frame.

No. 806,798.—B. A. Gramm, of Chillicothe, Ohio.

This is a combination of frame, transmission gearcase, trussrods, and radius rods, substantially as the sketch indicates. The side members *a* of the frame carry the transmission gearcase *b*, in which *c* indicates the shaft from which a sprocket-chain drives the rear axle. The trussed rods *h h* screw into this case and the radius rods *m n* are also pivoted to the case. Full elliptic springs are used. The inventor's argument is that any fore and aft shock received by one of the wheels, either front or rear, is transmitted by the radius rods to the others, which he considers an advantage.

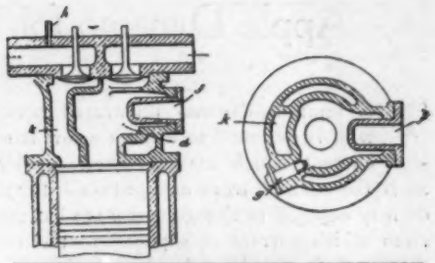


GRAMM TRUSSED FRAME.

Dust Laying Preparation for Roads.

No. 807,126.—C. V. Potter, of Balwyn, Victoria, Australia.

This mixture is composed partly of oil (the kind of oil not stated), partly of tar and asphaltum, and a small proportion of the refuse left after the distillation of glycerine, together with a small quantity of carbolic acid, apparently for the purpose of preventing fermentation. The acid and oil are first mixed with some water, and are then heated to, say, 150° Fahr. Powdered asphaltum, in the proportion of about 5 per cent., is added, followed by tar in the proportion of from 10 to 50 per cent., followed by 5 per cent. of glycerine refuse. The proportion of cold water varies from 3 of water to 1 of mixture, to 10 of water to 1 of mixture, the first named being used for the first coat on the road. The road is thoroughly soaked before the mixture is applied, and the inventor's intention seems to be that the glycerine refuse will tend slightly to attract moisture to prevent the road from getting very dry, while, nevertheless, the oil and other ingredients will shed water in case of rain.



TURENNE KEROSENE ENGINE COMBUSTION CHAMBER.

Combustion Chamber for Kerosene Engine.

No. 807,338.—E. L. P. Turenne, of Paris, France.

The combustion chamber is formed in two parts, *d k*, of which the air enters the latter and is exhausted from the former through the valves indicated. Oil is introduced through the injector *g* and mingles with fresh air as the latter is compressed into the chamber *d*. The ignition takes place spontaneously from the heat of the thimble *f*. The pipe *h* is for the purpose of introducing a small quantity of water with the air, if desired, for the purpose of keeping down the temperature of the mixture, and permitting higher compression.

Oil Engine.

No. 807,391.—A. A. Low, of Horseshoe, New York.

This is a simple arrangement of three separate injectors for the introduction of naphtha, kerosene, or alcohol into the mixing chamber of an oil engine, together with another aperture for the introduction of compressed air, which mingles with the fuel selected before the latter goes into the engine.

Apple Dynamo for High Tension Ignition.

THE ignition dynamo illustrated herewith is designed to furnish a low tension current which may be used exactly as is the current from an ignition battery, or may be used to charge a storage battery from which current is supplied to the induction coil or coils. The dynamo is regularly fitted with a beveled friction driving pulley which is under the control of a governor, the governor preventing the dynamo from running so fast as to generate a current strong enough to burn out or damage the winding.

As the accompanying sectional drawing shows, this machine, which is built by the Dayton Electrical Mfg. Co., of Dayton, O., under the name of the Apple dynamo, is of simple and substantial construction, having few parts, most of them comparatively large, and the wearing parts easily renewable. Though shown with Hess-Bright ball bearings, the machine is also built with plain phospor bronze bearings, in which case lubrication is effected by means of an oil cup feeding the bearings through felt wicks.

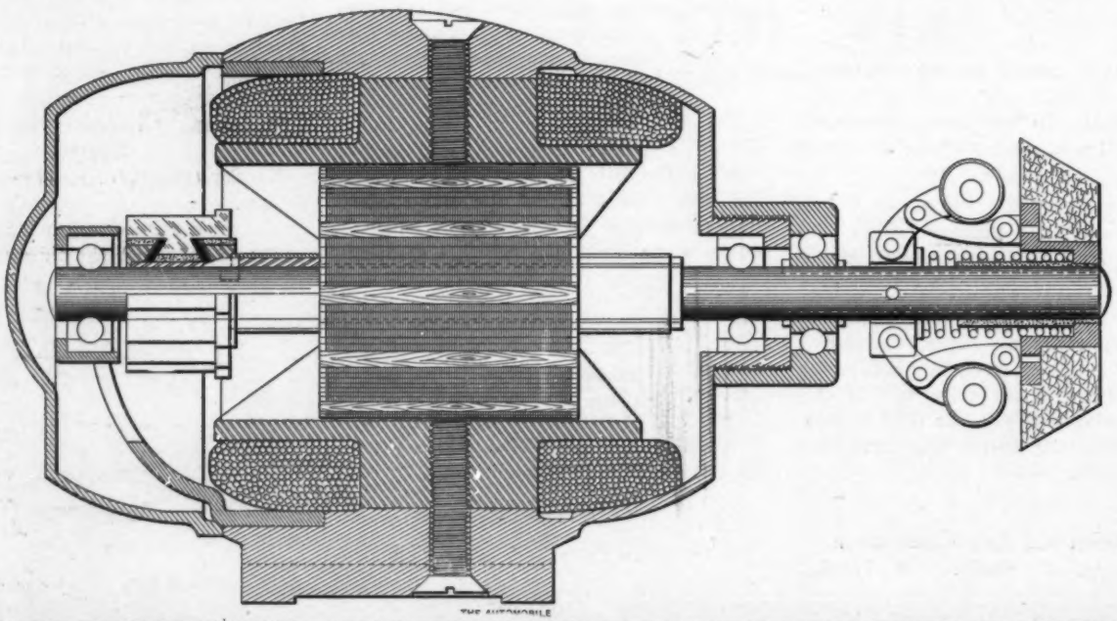
The armature core is made up of soft sheet iron disks which are japanned and, after being put in position, subjected to great pressure, the plates thus forming a solid core which is mounted on a brass sleeve keyed to the armature shaft. The winding wire is carefully covered, and is further subjected to a vacuum process when in position which results in all the interstices between the wires being filled with insulating material which hardens and, in addition to improving the insulation, adds to the solidity and strength of the whole armature. The commutator is built up of drawn copper segments with mica insulation; no nuts or screws are used in assembling it, the parts being forced together by hydraulic pressure. The manufacturers state that there is no danger of any of the parts working loose.

The field magnets are wound and placed as the line engraving shows, inside the outer casing, and are secured by heavy screws. On the pulley end of the machine the casing extends to and forms a support for the bearings, while the commutator end is closed by a door which gives access to the commutator and through which the armature is withdrawn in taking the machine apart. The door is kept closed by a spring catch, and the entrance of dust, water or oil is prevented. The bearing at the commutator end is supported by a bracket rising from the bottom of the case casting. The door and its catch are clearly shown in the engraving of the exterior of the dynamo.

The governor is an important part of the equipment, as it keeps the speed of the generator within safe limits and prevents the danger that would otherwise result from over-production of current. It is a simple fly-ball arrangement: When the governor balls rotate so fast that the centrifugal force is sufficient to overcome the resistance of the coiled spring, the bevel pulley is withdrawn from contact with the wheel that drives it, and the speed of the dynamo shaft decreases until the pressure of the spring is greater than the centrifugal force exerted through the governor balls, and the pulley again makes contact. In actual practice the fluctuations are slight, the pulley usually remaining in contact with the driving wheel, but allowing sufficient slip to keep the speed down to a comparatively constant rate.

The Apple dynamo will, the manufacturers state, give a three-ampere charging rate on an eight-volt battery at 1,400 revolutions a minute; a three-ampere rate on a six-volt battery at 1,200 revolutions a minute; and the same rate on a four-volt battery at 1,000 revolutions a minute. The machine is wound to give a heavy output at low speeds; it may therefore be used direct connecting to the induction coils, as a battery would be, when the motor can be started by the crank in the usual way, the dynamo furnishing sufficient current for the initial spark. Or, as has already been stated, the dynamo may be used to charge storage batteries and the current supplied from the batteries to the coils. Once the engine is started the dynamo rapidly attains its maximum speed and the governor comes into play, preventing over-speeding. The speed may be regulated by adjusting the tension of the governor spring.

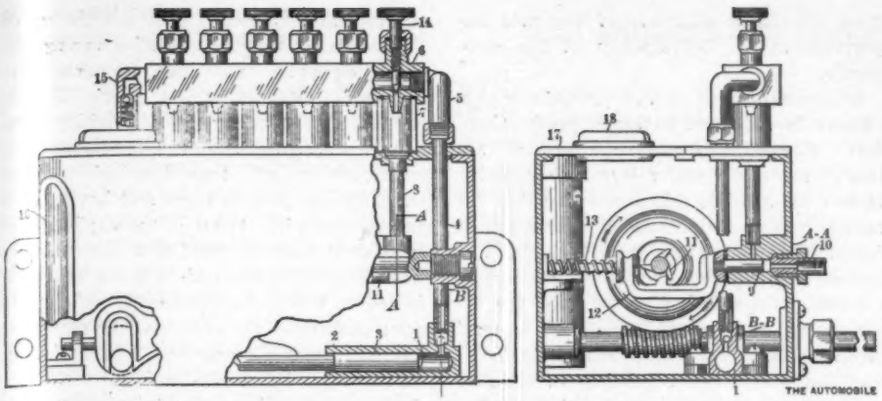
A point of advantage claimed is that the Apple dynamo can be placed in any position without affecting its efficiency—which is frequently a great convenience where space is scarce. Belt, chain or gear drive can be fitted, though the manufacturers recommend the bevel friction drive illustrated as being the best for average conditions.



APPLE LOW TENSION CURRENT GENERATOR, PARTLY IN SECTION, SHOWING GOVERNOR, BALL BEARINGS AND COMMUTATOR.

Columbia Lubricator.

Mechanically driven lubricators with pumps for forcing the oil under pressure to the various bearings have given such excellent results in actual work that they are increasing in popularity and in efficiency. A device of this class, manufactured by the American Lubricator Co., and called the Columbia lubricator, is illustrated and described herewith.



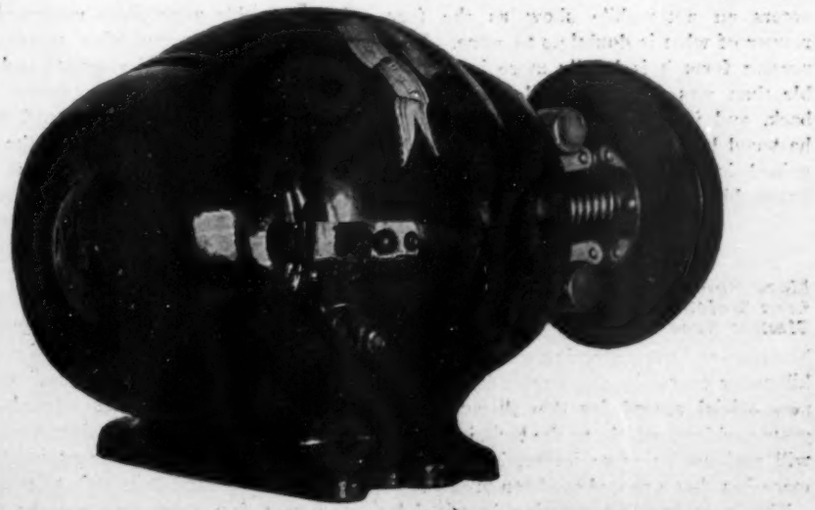
SECTION DRAWINGS SHOWING OPERATING MECHANISM OF COLUMBIA AUTOMOBILE LUBRICATOR.

The Columbia lubricator consists essentially of an oil tank or reservoir in which the mechanism runs, submerged in the oil, and a distributer, placed on top of the tank and supplied with oil by a large pump; small pumps force the oil through oil leads to the bearings. Referring to the drawing showing a cross-section of the lubricator, the driving shaft, which may be rotated by belt and pulley, chain and sprocket or by ratchet, from the engine, passes through a stuffing box into the reservoir, and the inner end is carried in a bearing on the opposite side of the reservoir. The large pump that supplies the distributer with oil is driven from the main shaft by a crankpin and yoke arrangement. The longitudinal view of the lubricator shows the pump and its driving gear, the pump being on the right and the crankpin and yoke on the left, near the bottom; the pump cylinder is marked *2* and the plunger *3*. The pump draws oil through the opening *1* and forces it up through check valve and tube *BB*, tube *4* and elbow *5* to the distributing head on the top of the reservoir. The distributer is essentially a small reservoir with an outlet, the opening of which is adjustable by means of a valve for each feed. The end of the distributing reservoir is seen in section at *6; 14* is the needle valve for regulating the feed opening, and has a knurled head on the top for easy adjustment. The large pump has a capacity equal to the full capacity of all the feed valves; under running conditions, therefore, a good deal more oil will be pumped than can be passed through the feed valves. The surplus is returned to the main reservoir by way of the ball valve *15;* the valve spring is rather stiff, so that considerable pressure exists in the distributing reservoir, insuring the quick and positive delivery of the oil through the valves.

After leaving the distributer the oil falls through tubes, one of which is shown at *8*, and enters the barrels of the individual pumps; there is a pump for each feed, and one is shown at *9* in the transverse section; the lead to the bearing or other point to be lubricated is attached to the nipple *10*. The pump plungers are actuated by yokes, there being a yoke for every two pumps. The yokes, with plungers attached, are drawn back by fingers on a rotating shaft, there being a finger, *11*, for each yoke, *12*. A spring, *13*, compressed on the back stroke, furnishes the energy when released for driving the oil through the lead on the forward stroke. The individual pump shaft, driven by the worm gearing, makes one revolution to forty-two revolutions of the main shaft.

There is a glass gauge, *16*, in the main reservoir through which the height of the oil can be seen; a large screw plug, *18*, is removed when the tank is to be filled. The front part of the cover, *17*, can be removed for cleaning or repairs, so that it is not necessary to disconnect the feeds and remove the lubricator from the dash for this purpose.

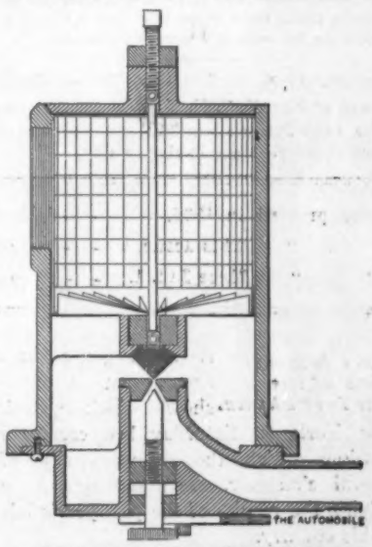
The lubricator illustrated has six feeds; it is manufactured, however, with any desired number. The body is of polished aluminum, with distributer, packing nuts, stems, elbows and filler plug of polished and nickeled brass.



EXTERIOR VIEW OF APPLE DYNAMO, SHOWING END DOOR AND CATCH.

Heath Rotary Carbureter.

An essential part of the work of a carbureter is to divide the gasoline into the finest possible particles, and to mix those particles intimately and uniformly with the air necessary to form the explosive mixture. The carbureter illustrated by the accompanying line engraving is provided with mechanical means for breaking up the particles of gasoline and effecting the mixture



HEATH ROTARY CARBURETER.

with air; the device is the invention of Lester E. Heath, of 191 Caroline street, Saratoga.

The main feature of the Heath carbureter is the revolving cylinder of wide-meshed wire netting. This cylinder is mounted on a spindle which turns freely in bearings at top and bottom. The lower part of the cylinder contains fan-shaped blades; the air, passing through the carbureter under the suction of the motor, causes the fan and the attached wire netting cylinder to revolve at very high speed. The spraying nozzle is below the lower bearing of the spindle, and the gasoline, passing upward with the air, is broken up into fine particles by the spinning cylinder and passes to the motor in a state of intimate mixture with the air, so that the gas, according to the inventor of the carbureter, is very easily ignited and burns rapidly and completely, giving a clean, odorless exhaust and maximum power for the quantity of gasoline used.

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Some Impressions of the New York Shows. A rapid glance at the two great automobile shows which opened in New York on Saturday last creates impressions which, though necessarily of a general character, are interesting as embodying the results of the past year's labors in this country.

Doubtless the first thought induced by a preliminary survey of the exhibits is that the American manufacturer is rapidly cutting down the lead gained by the foreign builders before the automobile was seriously taken up in this country; and while this idea has been expressed so often as to have become almost hackneyed, it is nevertheless true.

The shows have settled the question as to whether prices would increase or decrease. Prices have both increased and decreased, and it is now possible to purchase more expensive and less expensive cars than ever before, and the purchaser in each separate case receives better value for his outlay. The extremely wide range of prices is well shown in the car symposium, published in the last issue of THE AUTOMOBILE.

The attendance—the visible expression of public interest—was extraordinarily large from the moment the doors were opened. The automobile vitally interests the *general public*, and not alone the comparatively small number of actual users. This is a state of affairs which is of the first importance in the development of the automobile.

Little attention is paid by prospective purchasers to claims of extreme speed. Comfort, accessibility and convenience are looked for and speed referred to casually. It may be noted in this connection that the racing cars that have been prominent at former shows are conspicuously absent. The general turning from speed to comfort is reflected in the design of the cars, the arrangement of the stands, and the general lay-out of the shows. The demand for comfort and usefulness, regardless of weather conditions, is emphasized by the number of enclosed vehicles shown.

Shaft drive has attained a remarkable degree of popularity, and is seen on a majority of the American cars. The American manufacturer's faculty for development has been brought to bear on the two-cycle motor—a prime mover offering many advantages in the way of constant torque, simplicity, low cost and high power for weight.

Among the features noticed in a broad view may be mentioned the close attention that has been given to the problem of improving the clutch; the number of large cars fitted with planetary transmissions; the high degree of development of the positive force-feed lubricating system, almost universally used in American cars; the fact that "tool steel" no longer marks the limit of excellence in materials; that the dry battery has in many instances given way to the storage battery and the magneto. These are among the most prominent instances, but many others exist.

The prominence of the commercial car was inevitable, and the attention given it by experienced builders is significant. It is by no means improbable that the near future will see shows in the large centers at least, devoted exclusively to this class of machine—an opinion expressed by more than one exhibitor.

As the automobile was an interesting curiosity, or at most a serious possibility, at bicycle and other exhibitions where it was first shown, so the dirigible balloon enters an automobile show as the forerunner of what is doubtless to come. In its present form it is hardly more impracticable than was the automobile of a decade back, and its development will be greatly hastened by the knowledge and experience gained in bringing the mechanism of the automobile to its present state of efficiency.

✱

More Power, Less Weight, Similar Speed. The remarkable performance of Hemery in driving the new 200-horsepower Darracq racing machine over a kilometer course in 20 3-5 seconds, setting a new official record for that distance, suggests problems which, to the technical mind, will perhaps be more interesting than the mere fact that a record has been broken.

The most puzzling question is raised by the fact that Hemery's time exactly equals that made by Bowden, with his racing machine equipped with two 60-horsepower Mercedes motors, at last year's Florida tournament. Hemery's car, weighing 2,176 pounds and propelled by a 200-horsepower motor, did no better than Bowden's machine, weighing 426 pounds more and having only 120 horsepower. What is the explanation? It must be borne in mind that Bowden's car was never built for such a speed as it was forced to travel, but was a "freak" hastily put together for the occasion; the motor set up a tremendous vibration. Hemery's car, on the other hand, was built especially for short, high-speed runs, and formed to pass through the air with the least possible resistance, and has a smooth-running motor. Why, then, was the French car unable to do better than equal the time of the Bowden machine?

The question is purely a technical one and is doubtless capable of solution; but whether there is a difference in the comparative efficiency of the two cars, or of the speed possibilities of the respective courses, or whether other factors are involved, it is difficult to say offhand. Some of our readers, however, may be interested in attempting the solution of the problem, which involves more factors in the way of air resistance, tractive effort, road surface conditions, mechanical efficiency, and the like than appear on the surface.

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Importance of the Small Car. Until lately there has been a strong tendency among Continental and English manufacturers to cater to the buyer of large means, almost to the point where provision for the man of moderate income was lost sight of and as a natural result cars have been growing bigger and bigger. Wheelbases have been lengthened, power increased and body building equipment brought to a degree of luxury never even approached in the most elaborate horse-drawn vehicles.

This result was inevitable, in view of the immeasurable advantages possessed by the automobile over any other means of conveyance for use on city streets and country roads, and a contributing factor has undoubtedly been the novelty and vogue of the self-propelled vehicle. In the rush to cater to the demand for luxurious cars the foreign manufacturers have in many instances lost sight of the users of small cars which at one time, earlier in the history of the industry, received the serious care of many of the best builders.

The recent Salon at the Grand Palais and the English shows as well indicate a renaissance of the "voiturette," many excellent small cars being offered for the current year. In many instances makers have devoted considerable engineering skill to the design and it is safe to predict that the next few years will see the runabout

and light, medium cost touring car returned to the position formerly enjoyed.

The case in America is not quite the same, the two big shows now occupying Madison Square Garden and the Sixty-ninth Regiment Armory offering a number of excellent small touring cars and a number of well designed runabouts, but nevertheless the tendency is seen on all sides to consider the big, high-powered machine with luxurious body as the mainstay of the industry. Omitting the consideration of the commercial vehicle as a substantial and permanent source of business, it seems that a more extended scope should be given the car of moderate first cost and up-keep.

The tendency would seem to be towards specializing, as in other industries, and if this is carried out it may mean eventually that the high-powered touring car will be built as an exclusive model, as indeed it is already in several cases, and that the runabout will be made in quantities as an only model. In this connection it may be noted that in many instances concerns building both small and large cars follow different practices in the mechanical details of the two models, using planetary transmission for one and clash gear for the other. Engine disposition is varied also, horizontal opposed two-cylinder engines being frequently employed in the runabout and moderate cost light car with vertical engines in the higher-priced model.

Considering the vast possibilities of this country as a market for automobiles of low or moderate cost it would seem unnecessary to call attention to the importance of serious care in this branch of designing and building, but that there is a wide demand for a well-built and attractively designed machine is evidenced on all sides by the talk of visitors from out of town at the two shows.

A model offered by several makers but discontinued by a few is the moderately powered, detachable tonneau light touring car. This type meets the requirements of a considerable number of prospective buyers and although a difficult body to design on good lines the problem is by no means impossible of solution, a few instances being noticeable which are pleasing in lines when seen as a single or two seated car.

Conventional appearance is another matter that has been given more thought than heretofore and a number of light cars are offered this year which outwardly closely resemble the so-called French type. This is as it should be, original design in car bodies being much like "original" architecture—striking but not agreeable.

From the excellent showing made this year by the American manufacturer in the way of light cars it is to be hoped that next year the offerings of this desirable type will be so varied that it will be difficult only to decide between the different makes rather than between cost prices of wide range.

Society of Automobile Engineers.

WELL prepared papers on technical subjects were read at the meeting which followed the first annual dinner of the Society of Automobile Engineers, held at the New Grand Hotel, New York City, on Monday evening, January 8. Both the dinner and the subsequent meeting were of a pleasantly informal nature; and the common ground upon which the members met assured unity of interests.

Thirty members sat down to the dinner, the president, A. L. Riker, occupying the place at the head of the table. After the banquet the more serious business was taken up. The papers read included one on "Materials of Construction," by T. J. Fay; on "Ball Bearings," by Henry Hess, and on "The Ideal Carbureter," by E. T. Birdsall. Discussions of the subjects covered were held by the members after the papers had been read; and the papers were ordered to be printed in the Transactions of the Society.

The following members were present:

H. M. Swetland, A. L. Riker, E. T. Birdsall, H. P. Maxim, Alex. Churchward, Thos. J. Fay, W. J. P. Moore, Henry Hess, M. M. Whitaker, H. W. Alden, G. A. Wells, Jr., Lafayette Markle, B. Morgan, E. K. Conover, J. G. Perrin, H. H. Kennedy, G. E. Franquist, A. C. Schulz, John M. Lansden, Jr., A. H. Whitney, John Aspinwall, R. A. Fliess, Edward F. Schnuck, R. D. Macdonald, F. E. Bright, Wm. P. Kennedy, Jefferson Treen, Herbert Ladd Towle, H. P. Moonus and H. F. Donaldson.

There was some discussion as to the advisability of holding a summer meeting in some city west of New York; Buffalo was favored by many members for this purpose. It was decided that the secretary, E. T. Birdsall, should later on take a mail vote on the subject and so ascertain the wishes of the majority.

A. A. A. DIRECTORS MEET,

And Pass Resolutions Favoring Construction of Special Speedways

The American Automobile Association has put itself on record as being opposed to road racing except upon specially prepared speedways. This action was taken at the meeting of the Board of Directors at the Sixty-ninth Regiment Armory on Tuesday afternoon, after the reading of a communication relative to the proposed speedway at Pennington, N. J., and a well-defined rumor that a similar course is projected on Long Island. The resolution, which is practically an indirect disavowal of the system under which the Vanderbilt races have been run, reads as follows:

"*Resolved*, That it is the sense of the Board of Directors of the A. A. A. that special speedways for automobile racing and testing of cars have become necessary, and that the Board encourage the construction of such speedways throughout the country."

Elliott C. Lee, W. T. White and A. R. Pardington were appointed a nominating committee to name a ticket for the annual election, which will be held in Chicago next month.

With a balance of $4,520 in the treasury, and a total membership of upward of 8,000, the affairs of the A. A. A. are in a most prosperous condition. The New York Motor Club was admitted to membership, making a total of 62 affiliated organizations.

Those present at the meeting were: President Elliott C. Lee, Massachusetts Automobile Club; Dave H. Morris, Automobile Club of America; A. R. Pardington, Long Island Automobile Club; William H. Hotchkiss, Automobile Club of Buffalo; R. L. Lippitt, Rhode Island Automobile Club; Asa Goddard, Worcester Automobile Club; E. E. S. Reese and Windsor T. White, Cleveland Automobile Club; N. M. Pierce, Binghamton Automobile Club; F. H. Elliott, Syracuse Automobile Club; G. E. Farrington, Automobile Club of New Jersey, and Secretary A. G. Batchelder.

WERNER WILL DRIVE EMPEROR.

PARIS, Jan. 1.—Werner, who for a long time had charge of the late Clarence Grey Dinsmore's racing machines, has been officially appointed head chauffeur to the Emperor of Germany, and will in future always drive the head of the German dynasty. Mr. Dinsmore, who had a more complete racing "stable" than perhaps any man of his day, had a great admiration for Werner as a driver. At the 1905 Gordon Bennett race, one of the last race meetings that the American sportsman attended, Mr. Dinsmore watched with critical interest the start of the different competitors, and on Werner coming up to the line declared: "Now we have Werner, we shall see him go over the line like a shot." Then turning to the little group around him he eulogized the German driver and declared that for coolness, daring, and a keen judge of distances there was no man to equal him. It was said when Mr. Dinsmore died that Werner would never again find such a brilliant situation, but events have shown that the automobile leads even to royal courts.

Do not make the mistake of sousing a very hot bearing with water; this is apt to cause cracking or warping of the heated parts. Let the bearing cool gradually, and give it a copious supply of oil when starting out.

Sometimes a motor will give perceptibly better results in cold weather if a lighter grade of gasoline is used.

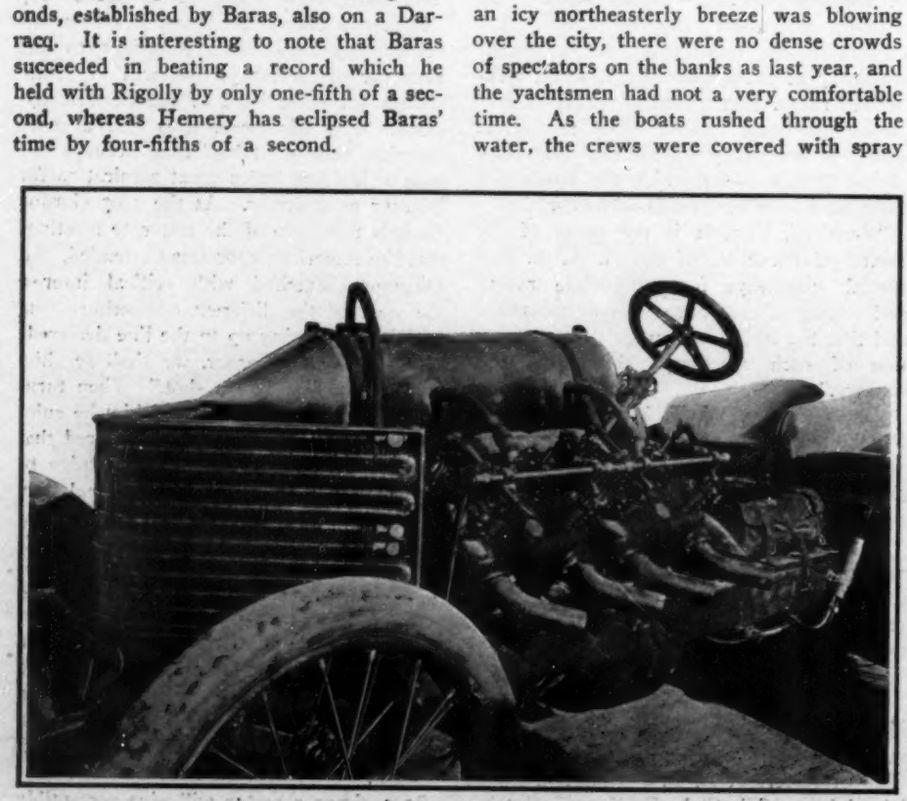
Hemery Places the Kilometer Figures at :20 3-5.

PARIS, Jan. 1.—The world's record for the flying kilometer straightaway was placed at 20 3-5 seconds twice in four successive trials by Hèmery, winner of the Vanderbilt Cup race, in a special Darracq racer, on the road between Salon and Arles last Saturday morning.

An icily cold wind was blowing at the time, and the atmospheric conditions generally were not favorable. The four attempts were made in the direction of Arles to Salon, with the wind ahead, as specified by the regulations. On the first run the Vanderbilt champion was timed 21 4-5 seconds for the kilometer. Hèmery drove back and started again, rushing by at a terrific pace, and covered the kilometer in 20 3-5 seconds, beating all accepted records for the distance and tieing the time made by H. H. Bowden with his 120-horsepower overweight Mercedes in Florida last Winter. Hèmery was not satisfied, however, and a third run was made in 20 4-5 seconds. On a fourth attempt the figures made in the second trial (20 3-5 seconds) were tied.

Although satisfied that he could do better, it was too late for Hèmery to make any more attempts, and indeed he had reason to be content with his success, having driven a kilometer at the rate of 108.59 miles an hour. This leaves the Dufaux official record of 23 seconds for the same distance, made on the same road on November 17 last, a long way behind. It is also a big jump from the time of 21 2-5 seconds, established by Baras, also on a Darracq. It is interesting to note that Baras succeeded in beating a record which he held with Rigolly by only one-fifth of a second, whereas Hemery has eclipsed Baras' time by four-fifths of a second.

The car which Hèmery drove was weighed in the presence of the official timers and turned the scales at 990 kilos (2,178 pounds). In construction it is a distinct departure from the No. 18 of the Vanderbilt Cup race. It has a pressed steel Arbel frame, with the wire wheels so familiar on Darracq racers, Dunlop tires and Truffault suspension. The motor consists of two groups of four cylinders each, arranged in the form of a V, with the exhausts on either side two or three inches above the top of the side frame. The water tank is placed in the angle of the V, the front of it being pointed. The radiator is also sharply pointed like the bow of a boat. The eight cylinders develop about 200 horsepower, having 170 mm. bore and 140 mm. stroke, and turning a single crankshaft. There are two speeds, with direct drive on the high by propeller shaft. Sparking is by a low-tension Nieuport magneto, and the gasoline tank is carried behind the driver's seat.



EIGHT-CYLINDER, 200-HORSEPOWER ENGINE OF DARRACQ RACER WITH WHICH HEMERY BROKE KILOMETER RECORD.—Note Inclined Cylinders and Pointed Radiator and Water Tank.

AUTO BOAT RACE AT PARIS.

PARIS, Dec. 31.—The motor boat races on the river Seine at Paris for the Coupe du Salon, did not pass off in a very brilliant manner. December 3 had been originally fixed for this event, which derives its title from the fact that it is held during the Automobile Salon, but owing to the river being in flood, the date was changed to the last day of the year. This afternoon an icy northeasterly breeze was blowing over the city, there were no dense crowds of spectators on the banks as last year, and the yachtsmen had not a very comfortable time. As the boats rushed through the water, the crews were covered with spray which immediately froze on their clothes and faces with true Arctic effect.

The starting point was fixed at the Debilly foot bridge, just below the industrial section of the show, and the run was to an island nearly three miles down stream, the racers being down for five rounds, 29 miles, and the cruisers for three rounds, 17.4 miles; whilst the extra-relementaire class for cruisers were given two rounds, 11.6 miles.

As in all French motor boat races held this year there was a great discrepancy between the published entrance list and the actual starters. Amongst the racers *Antionette*, the fast Levavorseur craft, was the only starter, but even her walk over was not a brilliant success, for something went wrong soon after the start and at the end of the first round she retired. There were about twenty cruisers left, but none of them presented any special interest.

The large fleet which had been on view at the show had been dispersed, and the boats intended for the 1906 season were far from being ready to take the water.

The fastest time of the day was furnished by the cruiser *Foriès Pas*, with a Mors motor, which covered the 17.4 miles in 56m. 57s. This was the only craft which has gone right through the year's racing season from Monaco to the Salon races. In another series of cruisers *Mendelssohn*, with Mutel motor and Despujols hull was first in 1h. 24m. for the 17.4 miles; *Florentia IV.*, an Italian boat entered by the Florentia Company, covered the same distance in 1h. 4m. 14s., being the first of her series.

AN AWKWARD SITUATION.

Ownership of a Pierce Car a Hard Knot for Buffalo Lawyers.

BUFFALO, Jan. 13.—An amusing controversy over the ownership of an automobile has grown out of the drawing of prizes at the Grand Army Bazaar held recently in Convention Hall in this city. The automobile is a Pierce stanhope runabout, donated by the George N. Pierce Company, of this city.

The drawing took place at the bazaar on Saturday evening, December 9, and the first ticket drawn from the wheel of fortune, and the one entitling the holder to the automobile, bore the number 3020, and the name and address of Miss Mary Reyburn, of this city.

Miss Reyburn is a member of the local branch of the Daughters of the American Revolution, which produced a sketch at the bazaar one of the nights. Miss Reyburn arranged the performance and, in order to carry out the plans, it was necessary for her to have an assistant. Miss Reyburn bought two admission tickets, one for herself and the other for the assistant, wrote her name and address on the stubs and deposited them in the regular way with those of other ticket purchasers. In her list of ex-

HEMERY BREAKING THE WORLD'S KILOMETER RECORD BETWEEN SALON AND ARLES, FRANCE, ON DECEMBER 31.

penses Miss Reyburn included the charges for the two tickets and she was reimbursed for her total outlay.

The Daughters of the American Revolution put in the claim that inasmuch as the winning ticket had been bought with the money of that organization the automobile should be awarded to it. As a result of the controversy, the automobile is being held by the Pierce company to await an agreement between the different claimants.

The possibility of legal action to gain possession of the car is eliminated by the lottery phase of the question. The transaction has been characterized by decision of the government as a lottery and this would be an awkward subject to submit to the courts. Nobody knows this better than the lawyers who have been retained by the interested parties in dispute. Astute lawyers are wrestling with the case. Simon Fleischmann represents Miss Reyburn, Franklin D. Locke has charge of the claims of the Daughters of the American Revolution, William B. Hoyt has been retained by the George N. Pierce Company, and Judge Harlan J. Swift looks after the interests of the G. A. R. It is apparent that arbitration is the only means of raveling the tangle and the lawyers have held several conferences, but without effecting an agreement.

ASPHYXIATION IN A GARAGE.

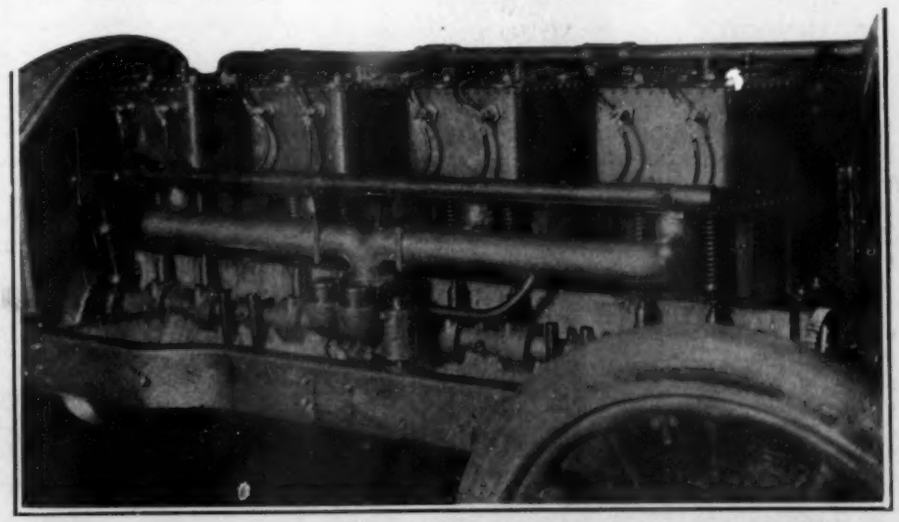
NEWARK, Jan. 15.—It has been discovered by several automobilists that it is dangerous to work in a garage with the doors and windows closed and a gasoline engine running. The engine consumes the oxygen in the air, and in time will cause death to any one in the room, unless the supply is renewed from outside.

Investigation was made after Henry Fischer, a prominent automobilist of this city, not long ago had a narrow escape from death while making an examination of his automobile. The day being cold, he closed the doors and windows of his garage and started the engine. He had been engaged only a short time when he felt a drowsy sensation coming over him. Thinking that he was somewhat fatigued, Mr. Fischer sat down to rest and gradually dropped off to sleep. He probably never would have awakened again but for the timely appearance of his brother, who chanced to enter the garage and saw Mr. Fischer's prostrate form lying on the floor. Several attempts were made to revive him, but without avail. Help was summoned, and Mr. Fischer was carried into his home, where, after an hour's work, a doctor succeeded in reviving him. Upon learning the facts in the case the physician attributed the cause to asphyxiation.

Several scientific men, learning of the case, made a study of the facts, and concluded that it was the lack of oxygen that caused Mr. Fischer to fall asleep. In a closely sealed room the engine would in time exhaust all the oxygen, and finally cease to operate.

VANDERBILT 250 H.P.-RACER.

The huge eight-cylinder, 250-horsepower motor of the new racing car entered by Alfred G. Vanderbilt in the Florida speed tournament is shown in the accompanying photograph. The car, built under the direction of the owner, is the first American machine that has ever been entered in a race by a Vanderbilt. The machine was built in a private shop in Thirty-ninth street, New York, from parts made in various shops in the city. Details of the machine are lacking, but the motor appears to have mechanically operated valves on opposite sides of the pair-cast cylinders, sheet metal water jackets, double jump spark ignition system and pressed steel frame. The carbureter is automatic and has two spray nozzles of different opening areas, the mixture being regulated by drawing gas for low speeds from the chamber having the small nozzle and for high speeds from the other, the mixture for intermediate speeds being various combinations of the two. The car is said to be slightly under weight, as the result of considerable paring.



EIGHT-CYLINDER, 250 H.P. MOTOR OF RACING CAR BUILT FOR A. G. VANDERBILT.

Transcontinentalists Caught in Quicksand.

GALLUP, NEW MEXICO, Jan. 10.—Quicksand, a word that strikes terror to the heart of a Westerner who knows what it means, nearly brought our double transcontinental automobile tour to an untimely end last Sunday.

We had been listening to stories of quicksand for the last 200 miles, but really paid no serious attention to them, as both Fassett and myself were under the impression that the extreme cold weather of the last three weeks must have frozen solid anything in the quicksand line. This would naturally have been the case, but at the place where we broke through, the Puerco river was covered with so thick a blanket of snow that the real cold could not penetrate to a depth sufficient to freeze the quicksand underneath solid enough to bear up the *Mountaineer* and its load of 1,000 pounds of live and dead weight.

The most dangerous quicksand stream in Arizona is said to be the Little Colorado. This we crossed safely enough on the ice, which was so thick that heavy teams dragging wagons loaded with hay and wood crossed in perfect safety. The Shovlin was also crossed safely, although we had been given to understand that this stream was famous for the horses, cattle, sheep and wagons its quicksands had engulfed. It was the Rio Puerco that caught us, and all but swallowed the little car that had so successfully withstood the hardships of a 7,000-mile cruise through thirteen states and territories.

We were driving across the frozen river bed when without warning the car broke through the thin crust and dropped into the treacherous sands. We didn't realize at first the danger we were in, but as the car slowly settled deeper and deeper, despite all our efforts to extricate it, we remembered some of the quicksand stories, and got to work in earnest.

Tools, blankets, food, cameras and clothing were thrown out onto the ice. The tonneau, batteries, tanks and flooring followed, but still the car resisted every effort to get it clear. We carried the end of our steel cable ashore and made it fast to an ironwood bush, but the windlass that had helped us out of innumerable difficulties for the first time refused to do its duty, although we strained at it until we had bent the cranks almost double.

Meantime the car was settling deeper every minute, and already the sand and water were running over the tops of the rear wheels. A section house with its low whitewashed Mexican bunkhouse loomed up two miles to the west; we hurried to it and secured the services of a score of swarthy laborers from the South. Despite all they could do the car stuck fast. Then we built a platform around it with railroad ties and timbers and left it for the night.

To make a long story short, it took two days and three nights to get the *Mountaineer* free and had it not been for the very cold nights, the temperature dropping below zero soon after sundown and freezing everything solid, we would have lost the car. As it was, we had to dig it out in pieces and carry the pieces ashore, where we re-assembled them.

When we passed through Adamanda afterward, we took a spin down to the petrified forests and looked over the trees turned to stone. The sun's bright rays reflected from the crystallized agate formation showed in all the colors of the rainbow and the sight was one worth going many miles to see. It almost made up for having been caught in the quicksand. Our guide, Al Stevenson, who keeps the only hotel at Adamanda, showed us the petrified woods and took us for a walk across one of these petrified trees that had fallen across a deep ravine and formed a natural stone bridge. The tree was more than six feet in diameter and about 200 feet long, and can be crossed on horseback.

The rocks in the vicinity of Adamanda are covered with the writings of a prehistoric race. These hieroglyphics, if they could be interpreted, might reveal all that students have sought for years to learn about the races that peopled this country long before the advent of the American Indian. The inscriptions are as plain as the day they were chiseled on the face of the cliff.

PERCY F. MEGARGEL.

TRANSCONTINENTAL TOURISTS CAUGHT WITH THEIR CAR IN ARIZONA SNOW.

IDEOGRAPHS ON ARIZONA CLIFF.

Dr. H. E. Thomas, of Chicago, who has decided not to enter his Locomobile racer in the Ormond-Daytona tournament, has closed a contract with the White Sewing Machine Company for a steam racing car to be used in the Vanderbilt cup race and in other events for which it will be eligible. Dr. Thomas has also made an offer of $5,000 for the white racer *Whistling Billy*, which Webb Jay was driving at the time of his unfortunate accident in Buffalo last summer. The car is in San Francisco and apparently in good condition. Dr. Thomas intended to enter the car in the Florida races, but it could not be prepared in time.

The adjustment of the vibrator has a marked effect on the current consumption of the coil and consequently upon the life of the battery. Make the swing of the vibrator as short as possible, and see that it gives a clear singing buzz.

In case of emergency thick lubricating oil may be thinned with a little kerosene, but it is not a practice to be recommended.

CHICAGO CLUBHOUSE PLANS.

Structure to Cost $50,000 Planned to Occupy Present Site.

CHICAGO, Jan. 13.—Preliminary arrangements for the leasing of the present site of the Chicago A. C. clubhouse for a term of thirty years have been completed, and the lease will be drawn up and signed as soon as Mrs. Hetty Green's attorney acquaints himself with the Illinois law on the subject. The ground on which the present clubhouse now stands is owned by Mrs. Green. The plot is 80 by 170 feet, comprising an area of 13,600 square feet, and is valued at $350,000. The club was anxious to secure a 99-year lease on the property, but this was unsatisfactory to Mrs. Green, so thirty years was agreed upon.

The present clubhouse, which is an old residence, will be torn down as soon as the papers are signed, and a new structure will be erected at a cost of at least $50,000. When furnished this will probably represent an expenditure of $75,000. It is to be ready for occupancy by May 1. The plans, which are being made by B. H. Marshall, contemplate a three-story clubhouse, with the ground floor given over to a garage. This will be slightly below the ground level. An elevator will take the members and guests from the lobby of the garage, which is to be in the center, to the main floor above.

The club rooms will be conveniently arranged and will be the finest of their kind in the country, it is said. On the second floor will be the lounging, smoking and ladies' rooms, the restaurant and grill room. On the next floor will be the library and nearly forty sleeping rooms for members and their guests. It is planned to make the entire building conform to the style of an old English tavern. It will cover the entire property.

While the clubhouse is in course of construction the club will take temporary quarters in some office building or hotel, where the regular meetings can be held, and where the members can drop in of an evening. The necessary funds for the house have been practically raised.

BUFFALO AUTO BOAT CLUB MEETING

BUFFALO, Jan. 15.—A large and enthusiastic meeting of the Motor Boat Club of Buffalo was held in the Builders' Exchange, last Wednesday afternoon, Commodore J. G. Glasgow presiding. Among the most important matters discussed was the question of the clubhouse site. Several propositions from property owners on Grand Island were presented and a committee was empowered to conclude the matter. The club realizes the necessity for prompt and energetic action in this respect in order to have the clubhouse ready for occupancy with the opening of the season.

A handsome club burgee, designed by C. A. Criqui, was adopted. It consists of a red arrow-head with a blue star on a field of white. On behalf of the club, John F. Ellsworth presented official burgees to Commodore Glasgow, Vice-Commodore Caudell, and Rear-Commodore Elliott.

At the meeting the charter of the club was closed with fifty members, and in addition twenty-five applications were received and referred to the board of governors.

MARYLAND CLUB MEETING.

BALTIMORE, Jan. 13.—The meeting of the Automobile Club of Maryland last Wednesday night at the Hotel Altamont was probably the most important in its history. Eight new members were elected, bringing the total membership up to 120, an increase of nearly 50 per cent. over last year. An attorney was appointed to attend the session of the legislature at Annapolis and to apprise the club of the introduction of measures antagonistic to the automobile.

It is thought that the club is having prepared either an entirely new automobile bill or an amendment to the present law. The existing law, which allows a speed of six miles an hour in built-up portions and ten miles in open country and requires non-residents to register, is extremely distasteful to Baltimore autoists.

The matter of the decoration of new headquarters, which will be ready February 1, was discussed and the verdict was that no money should be spared to make them up-to-date in every respect.

The effort to get together a party to attend the Ormond-Daytona race meet has been successful and a private car will, it is said, leave this city for the Florida beach.

NOTES OF THE CLUBS.

BUFFALO.—The membership committee of the A. C. of Buffalo held a meeting several days ago, and took favorable action on eleven applications for membership, as follows: H. D. Mills, George Grant Parkhurst, R. K. Kitchens, Jr., Charles B. Kane, O. H. P. Champlin, F. E. Moskovics, Townsend Davey, J. M. Cushing, W. J. Frederick, C. F. Hotchkiss, E. A. Hoffman.

PITTSBURG.—The Automobile Club of Pittsburg is going into politics to the extent of supporting A. M. Jenkinson, the Republican candidate for mayor of Pittsburg. This was decided upon at the last meeting, at which officers for the club were nominated as follows, to be voted on at the annual election in February: President, George E. Turner; first vice-president, W. L. Smith; second vice-president, W. M. Darley; third vice-president, C. H. Miller; secretary, Paul Wolff; treasurer, George G. Glass; governors, Edward Kneeland, E. J. Kent, and C. L. Matheson.

PROPOSED NEW WINTON GARAGE.

Planning to erect the largest and finest automobile garage and salesroom in America, the Winton Motor Carriage Co., of Cleveland, has leased for a period of sixty-nine years, a plot of ground at the northeast corner of Broadway and Seventieth street, New York, and has engaged an architect to draw up plans for a four-story garage.

The lot has a frontage of 113 feet on Broadway and 101 1-2 feet on Seventieth street, the north property line measuring 153 feet.

The building will be constructed on the Hennebique system of armored concrete, which is said to be fireproof and indestructible, and will possess many novel features, not the least of which will be a roof garden especially designed for the use of chauffeurs. At one corner of the roof garden will be a chauffeurs' club room, with library and smoking room, the remaining space being given over to chauffeurs for the purpose of washing up their cars, making adjustments and tuning up.

Each of the four stories, as well as the roof garden and basement, will have 14,000 square feet of floor area, making a total of 84,000 square feet. The first floor will be devoted to salesroom and offices, together with handsomely furnished reception and retiring rooms for women patrons.

The second and third floors, as well as the major part of the fourth floor not devoted to the repair department, will provide space for the storage of 300 touring cars, thereby giving the new Winton garage enormous storage capacity.

The repair shop will be fully equipped with all necessary machine and hand tools, and will have accessory thereto a department in which will be stored all sorts of supply parts, thus providing full facilities for the quick repair of any Winton car, irrespective of the date of its production.

NEW FACTORY FOR TRUCKS.

GRAND RAPIDS, MICH., Jan. 15.—The factory of the new Couple-Gear Freight Wheel Co. has just been completed and the work of installing the machinery has been begun. It is expected that active operations will be commenced about January 22. This building will be used exclusively for the manufacture of five-ton trucks, and it is expected that the annual output will be about 300.

The structure is the first of a group to be built as the business of the company increases. Each building will be used to manufacture exclusively one size of truck. The trucks will range in size from one-ton delivery wagons to ten-ton trucks.

The new building is of brick, with a main building 50 by 200 feet, and a wing 28 by 100 feet. When everything is completed the cost of the building and equipment will be $75,000.

The company has control of seven acres of land around the new building.

News and Trade Miscellany.

Raymond A. Green of Passaic, N. J., formerly New York manager of the Locomobile Company of America, and previously connected with the Wanamaker automobile department, has organized the Green Motor Car Company, and is building a large salesroom, garage and repair shop with storage for seventy-five automobiles, on Washington and Bleecker streets, Newark, N. J. The company will represent exclusively the Locomobile, Smith & Mabley foreign cars, the Royal Tourist and the Oldsmobile. W. C. Overman, formerly of the Overman Wheel Company, will be general manager. The officers of the company are Raymond A. Green, president; W. L. Clark, vice-president, and Edward A. Green, treasurer.

The annual meeting of the Swinehart Clincher Tire & Rubber Company on January 6, resulted in officers being elected as follows: President and general manager, J. A. Swinehart; vice-president, William J. Frank; secretary, B. C. Swinehart; treasurer, Howard Secrist. These officers, with William Byrider and Frank Ream, of Akron, and M. S. Rudgers, of Brecksville, are the directors. The officers reported a profitable year's business.

What is said to be the first carload order for bicycle tires ever sent to the Pacific coast has been received by the Diamond Rubber Company, of Akron, and the manufacturers will make a shipment with the car properly bedecked with banners and gay colors. The order was placed by the Pacific Coast Rubber Company, of Tacoma, Wash., and Portland, Ore. The order is taken as an indication of the healthy condition of the bicycle trade, especially in the West, and the Diamond company has been receiving a large share of this trade.

Akron tire makers are as busy as they can be getting out their products despite the present inventory period. The big companies are operating to their fullest capacity, and in addition are preparing to attend all of the big automobile shows, where they will have fine displays. The Diamond Rubber Company is represented by twelve or fifteen expert men at the New York shows, and will make an equal demonstration at Chicago.

At the annual meeting of the B. F. Goodrich Company on January 10, the following officers were elected: President, Col. George T. Perkins; vice-president, B. G. Work; second vice-president, George W. Crouse; secretary, C. B. Raymond; treasurer, W. A. Folger, general manager of the works, W. A. Means; general superintendent, E. C. Shaw; assistant general superintendent, C. C. Goodrich; general sales manager, H. E. Raymond.

The beginning of the year sees a change in the White agency in Kansas City, which will hereafter be with the Missouri Valley Motor Car Company. Henry C. Merrill, who has handled the White for several years, quits the automobile business.

George W. Curtiss, a photographer, and W. L. Bell, of Kansas City, who sells school furniture, have formed the Crœsus Motor Car Company and propose to turn out two models this season—a runabout and a touring car. Mr. Curtiss became interested in automobiles by purchasing the parts and assembling one of the small Holley cars. Since then he has worked out what he believes to be new ideas in the automobile line and will incorporate them in his new product. The company has arranged for a shop at First and Main streets, Kansas City, Mo. The features of the touring car, as now announced, will be lightness and the absence of brass trimmings, all exposed parts being silver plated. The car is to be of four cylinders and 40-horsepower, weighing 2,390 pounds. It is to sell for $4,000.

Homan & Schulz, agents for Rambler and National cars, have opened a branch agency at 1241 Fulton street, Brooklyn, under the management of C. Randolph Smith.

E. T. Birdsall, who has for some time past been connected with the Decauville Automobile Company, of New York, has sold his interest in the company and will devote all of his time to the Birdsall Automobile Company and the Rochelle Motor Company, the latter of New Rochelle, N. Y.

Agencies for Corbin cars have recently been placed with the Keystone Automobile Company, Pittsburg, Pa., and in Rochester, N. Y., with the Genesee Motor Vehicle Company.

The Hartford Rubber Works Company has removed from 77 Bank street, Cleveland, O., into new quarters at 1831 Euclid avenue.

The Milwaukee branch of the McDuffee Automobile Company, of Chicago, Ill., handling the Stoddard-Dayton and the Royal Tourist cars, will shortly move into its new building on Wisconsin street, near the C. & N. W. Railway dépot. G. F. Discher, formerly connected with the old firm of Norton & Co., is manager of the branch.

The Ford cars are to be represented in southern Ohio and northern Kentucky by W. J. Friel, of Portsmouth, O.

In a recent issue, in this department, announcement was made to the effect that the Rainier Company's Chicago branch had moved into the quarters formerly occupied by the A. C. Banker Company, at 1253 Michigan avenue. The latter company states that it has rented only a part of the building to the Rainier Company, and that it will still continue to do business at its old stand.

Panhard & Levassor, American branch, of 230-232 West Thirteenth street, New York, announce that on February 1 they will move into their new up-town building at the northwest corner of Broadway and Sixty-second street.

The business of the Morton Motor Works, of San José, Cal., has been taken over by the Knapp Manufacturing Company, of 31 South Third street, that city, and the latter company will carry on the manufacture of gas engines for automobiles and motor boats.

Henry J. Ullman has sold his interest in the Pardee-Ullman Company, of Chicago, Ill., to F. J. Pardee, E. S. Hamill and Dr. W. P. Johnson. The new firm will continue to handle the Franklin and Packard machines.

The Gerber Carriage Company, whose plant in Pittsburg is located in Seventh street, down town, has secured an order for one hundred limousine bodies for delivery to a Western concern. The contract will amount to $100,000, and a large force of men will be started on the work at once.

Miss Olga Nethersole, the English actress, has just purchased a 35-horsepower Rainier touring car, which she will take abroad with her when she leaves this country shortly. Lew Dockstader, the "Minstrel King," is another theatrical celebrity to join the ranks of Rainier users.

The Packard Motor Car Company, of New York, states that its 1906 allotment of Packard cars has been sold, and that it has been practically unsuccessful in its attempts to secure relinquishment of advance orders by other agents, in spite of a generous premium offered.

The Motor Car Company, of Wilmington, Del., has decided to build a new garage on Orange street, above Fourth, in Wilmington. There are already several repair shops in Wilmington and the automobile interest appears to be spreading.

The Delaware Automobile Association has asked one of the turnpike companies having a fine road out of Wilmington to fix a special toll for different sizes of autos, but the company claims that it is unable to do so under its charter.

H. L. Brown, who has taken over the electric business of the Standard Automobile Company, of Pittsburg, with which he was formerly connected, has secured the agency of the Pope-Toledo car for Pittsburg. He will move into the garage of the Hiland Automobile Company in Baum street as soon as the big new Hiland garage in Center avenue is completed.

The Grant Motor Company, of Detroit, will move into the up-town automobile center February 1. Its new quarters will be at the corner of Alexanderine and Woodward avenues and are in the center one of three new auto buildings now receiving the final touches before occupancy. The company will carry the Buick and Thomas cars.

The Holson Motor Patents Company, of Grand Rapids, Mich., at its annual meeting recently elected the following board of directors: President, M. B. Church; vice-presidents, Alfred Holson and Dr. A. M. Webster; treasurer, Wesley W. Hyde; secretary, M. Clay Church.

The Banker Brothers Company, of Pittsburg, has shipped to New York the Pierce Arrow limousine car which it fitted up for George Lauder. It is, perhaps, the finest car ever sent out of Pittsburg and has attracted much attention. From New York it will be shipped to Cairo, Egypt, where Mr. Lauder, Mrs. Lauder and Miss Lauder will tour. Later they will go through the Holy Land and then tour in Italy, France, Scotland and England.

The Pence Automobile Co., Minneapolis agent for the Pope-Toledo, Stevens-Duryea and Buick cars, has received its first 1906 consignments of these three lines.

Hugo Tollner & Sons, of Brooklyn, announce that they are sole agents in Kings county for the Baker Electric Vehicle Co. The concern is located at 292-296 Taafe place, between DeKalb and Lafayette avenues. This agency was formerly held by R. R. Benett, of Greene avenue.

Another concern to announce its intention of removal to New York's automobile district is the Sidney B. Bowman Automobile Co., American agents for the well-known Clément-Bayard cars. The present location, while considerably enlarged by several additions during the past two or three years, has become inadequate for the accommodation of the business of selling, storage and repairing, and a new building is now under construction at 225-231 West 49th street, 200 feet west of Broadway. The structure will be a brick, steel and concrete building four stories in height, with a frontage of 75 feet on the cross street and a total depth of 100 feet, affording a floor space of 35,000 square feet. There will be a finely appointed salesroom, a handsome suite of offices, a well-equipped repair shop and sufficient space for the storage of 150 cars. The repair shop will be powered with electric motors and an elevator 8 by 19 feet will be installed.

INFORMATION FOR BUYERS.

A CATALOGUE IDEA.—A single picture will sometimes convey more practical information to the mind of the average man than whole pages of description, and in a much shorter time. With this idea in mind the Automobile Cover and Top Manufacturing Company, of 148 West Fifty-sixth street, New York, has embodied in its catalogue a sort of composite picture. The basis of this picture is a touring car without a top, equipped with a Gabriel horn. Turn over a cut-out leaf on the picture and the car is shown with a set of slip-covers over the upholstering on the seats. Another turnover and the same car has, in addition to the slip covers, a cape cart, top folded, while a third turnover shows the top raised and the car further equipped with a touring bag and floor cushions. The last turnover shows the car with top up and entirely inclosed with side curtains, containing transparent flexible windows; lamps are covered and everything ready for bad weather. The tops and other items shown are manufactured by the Automobile Cover and Top Manufacturing Company. This concern manufactures a variety of tops, as well as the necessary accessories. Tops are made to order only, and the suitability of the top for the machine is thus insured. The well-known Gabriel horn and supplementary spiral springs for automobiles are handled by this company. Price lists of both these specialties are given in the catalogue.

SEMI-SOLID TIRE.—A tire which is not solid nor yet pneumatic, but is said to possess some of the qualities of both, is the Universal tire, manufactured by the Universal Tire Company, of 1135 Broadway, New York. Upon the wood felloe of the wheel is bolted a channel steel rim; the rim is of approximately rectangular cross-section, and the edges of the flanges are turned over in a wide roll to avoid cutting the tire. Over the channel is stretched one or more layers of leather, the leather coming down over the sides of the channel, and being bolted to the wood rim by through bolts. The effect is to inclose the channel and part of the wood rim in a continuous band of leather; an air space is left in the channel under the leather. Outside of the leather is the outer covering of rubber and fabric constituting the tread of the tire; this is very thick at the actual tread and comparatively thin where it comes down over the sides, just as is a pneumatic clincher tire shoe. The rubber shoe is held in place by the same through bolts that hold the leather to the rim. Outside the rubber are steel rings against which the heads of the bolts come; the rings are provided with flanges which protect the rubber from scraping on curb stones and road obstructions. The rubber tread is suspended, so to speak, over the channel in the steel rim, and has great freedom for expansion, but is backed up and supported by the leather. The manufacturers claim great resiliency, immunity from puncture troubles, less trouble from chipping than solid tires, extreme security of attachment and light weight.

FOOT-RESTS.—One of the little devices that has come into existence in response to the demand for increased comfort in automobiles is a foot-rest. Such a device is manufactured by the E. T. Burrowes Co., of Portland, Me., and consists of a sloping rest, placed where it can be conveniently

BURROWES' FOOT-REST, FOR THE TONNEAU.

reached by the feet, with the proper slant to give the feet a comforable resting place. On rough roads foot-rests are particularly acceptable, as they enable the passenger to brace back against the seat and avoid being thrown around. The foot-rest is also useful as a place in which goggles, tools, gloves, caps and other odds and ends may be carried.

ZEUS TIMER.—A combined primary circuit closer and secondary distributer is manufactured by the Hawkins Mfg. Co., of Boston, Mass., under the name of the Zeus timer; the instrument is illustrated herewith. The peculiarity of the machine

ZEUS TIMER.

lies in the arrangement of the roller contacts of the primary circuit closer. In order that rollers may be used, running in oil and yet making a good contact, a scraper spring is fitted which cleans off the rollers, keeping them in good condition for making proper contact. At the same time the roller is slightly retarded, giving a slight friction against the stationary contact point, which improves the contact. The primary timer is also made separately; a special insulating material is used for the cases and is said to be particularly well suited for the work. The firm has had a wide experience in gas engine work and knows the requirements; facilities are available for manufacturing timers in large quantities.

STANDARD OIL LAMPS.—The manufacture of oil lamps for high-grade automobiles is a specialty of the Standard Carriage Lamp Co., of 49 South Canal street, Chicago, Ill. These lamps are symmetrically formed and substantially made; the headlights are fitted with ground semaphore lenses which project a strong light ahead of the car. The oil fonts are locked by a

STANDARD OIL HEADLIGHT.

special device. The lamps are guaranteed to stay lit under all conditions. An electric headlight is made on practically the same lines as the oil headlight, with the exception of some of the details necessary for one and not for the other source of illumination. The electric lamp is so made that it can be either screwed into a socket, which is recommended for commercial vehicles, or carried on forks in the manner customary in pleasure cars.

TRADE PUBLICATIONS RECEIVED.

IRON-CLAD MANUFACTURING COMPANY, 6 Cliff street, New York.—Series of catalogues covering a wide range of specialties in sheet metal, including tanks for various purposes.

TAYLOR AUTOMOBILE CO., INC., 33-35 Orange street, Albany, N. Y., sales, storage and repair station. Handsome calendar for 1906, showing an automobile going at full speed, the driver being a particularly attractive girl, artistically depicted in colors.

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Advertisements inserted under this heading at 20 cents per line; about 7 words make a line. Remittance should accompany copy. Replies forwarded if postage is furnished.

A LARGE Manufacturing Company in need of a profitable business for a new department or otherwise. Address Cleveland, care The Automobile. Jan25

COLUMBIA 1905 XLV 40-h.p., better than new; had best of care. This car will be sold for $2,850. Let me hear from you if you mean business. Joseph Gridley, 179 Highland ave., Somerville, Mass. Jan18